Adit and Portal Investigation Report 2013 Update

Rico-Argentine Mine Site – Rico Tunnels Operable Unit OU1 Rico, Colorado

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October 30, 2013

VIA EMAIL AND HAND DELIVERY

Mr. Steven Way On-Scene Coordinator Emergency Response Program (8EPR-SA) US EPA Region 8 1595 Wynkoop Street Denver, CO 80202-1129

Subject: Adit and Portal Investigation Report – 2013 Update Rico Argentine Mine Site – Rico Tunnels Operable Unit OU01 Rico, Colorado

Dear Mr. Way,

A digital file in PDF format of the Adit and Portal Investigation Report – 2013 Update, Rico Argentine Mine Site – Rico Tunnels Operable Unit OU01 Rico, Colorado, dated October 30, 2013, is being submitted to you today via email. Three (3) hard copies of the report will also be hand-delivered to your office no later than close of business November 1.

Atlantic Richfield Company (AR) is submitting this report responsive to requirements in Task D of the Removal Action Work Plan accompanying the Unilateral Administrative Order for Removal Action, Rico-Argentine Site, Dolores County, Colorado, U.S. EPA Region 8, Docket No. CERCLA-08-2011-0005.

Please note that this report presents all relevant investigation results from studies prior to 2013, and those preliminary results from ongoing field investigations that were available as of the date of this submittal. AR proposes to complete the field investigations and laboratory testing this fall, and to compile, interpret and document the 2013 results in a final version of this report to be submitted not later than January 30, 2014.

If you have any questions, please feel free to contact me at (951) 265-4277.

Sincerely,

Anthony R. Brown Project Manager

Atlantic Richfield Company

anthrong R. Brown

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List of Acronyms

AECI Anderson Engineering Company, Inc.

AIP Adit Investigation Plan

EPA Environmental Protection Agency

ER electrical resistivity
FSP Field Sampling Plan
HAS hollow stem auger
PVC polyvinyl chloride
ReMi Refraction Microtremor
RQD Rock quality designation

SLT St. Louis Tunnel

SPT Standard Penetration Test

ST Shelby Tube

1.0 Introduction

1.1 Purpose and scope

This document updates the initial Adit and Portal Investigation Report submitted as Part D of the 2011 Investigations, Analyses and Evaluations report (Atlantic Richfield Company, 2011a) required under Subtask D1 of the Remedial Action Work Plan (RAWP) for the Rico-Argentine Mine Site (EPA, 2011). This updated report documents the work accomplished to date pursuant to the program of site investigations and laboratory testing in the approved original Investigation Plan for Collapsed Adit Area at St. Louis Tunnel (referred to as the Adit Investigation Plan or AIP) (Atlantic Richfield Company, 2011b), the Supplement to the Investigation Plan for Collapsed Adit Area at St. Louis Tunnel (Atlantic Richfield Company, 2012; referred to as the Supplement to the AIP), and the 2013 Supplement to the Investigation Plan for Collapsed Adit Area at St. Louis Tunnel (AECOM, 2013a; referred to as the 2013 Supplement to the AIP). The location of the adit collapse area relative to the St. Louis Ponds site is shown on Figure 1.1.

The primary objectives of the investigations as described in the AIPs were to:

- Investigate the condition of the collapsed portion of the adit and how it interfaces with competent rock at the brow of CHC Hill;
- Assess the possible accumulation of settled solids and water build-up behind the existing blockage in the collapsed area; and
- Provide information to support design of a hydraulic control system for discharges from the St. Louis Tunnel (referred to herein as the SLT).

Investigations to support achieving these objectives are focused on collecting, controlling, and conveying the adit flow from its current point of discharge to the water treatment facility ultimately selected as part of the overall remedy at the Rico Tunnels Operable Unit OU01. It is currently assumed that the discharges will be conveyed to the upgradient end of the demonstration wetlands currently being constructed in the former Pond 19 area (immediately north of Pond 18).

The investigations completed during 2011 and 2012, and results to date from the 2013 investigation program provide the key information necessary to identify appropriate alternatives to advance to 30 percent design, and then support final design of the selected alternative as described in the Preliminary Design Report, St. Louis Tunnel Hydraulic Control Measures (Atlantic Richfield Company, 2013b).

1.2 Organization

Section 1.0 of this report describes the purpose and scope of the investigations performed to meet the objectives of the RAWP and the associated investigation plans. Site reconnaissance and ground surveys are documented in Section 2.0. The locations, methodologies and results of the various field investigation techniques implemented at the site are described in Section 3.0. Section 4.0 presents the results of geotechnical testing performed to date. An interpretation of geologic and geotechnical conditions in the adit collapse area is presented in Section 5.0. References are provided in Section 6.0.

Note that results of geochemical analyses of mine waters encountered during the original field exploration program in 2011 and periodic sampling of borings AT-02 and BAH-01 are included in data previously transmitted to EPA and posted on the project SharePoint site.

2.0 Site Reconnaissance and Ground Surveys

Detailed site reconnaissance of the portion of the St. Louis Tunnel exposed in the U-shaped excavation behind the existing structure at the historic portal location (i.e., the adit collapse area, also referred to as the open, collapsed tunnel reach) was conducted in 2011 and again in 2013. Plans for detailed surveying of key visible features were developed based on the reconnaissance efforts and review of all available, relevant historic information. Targets selected for survey included the tops of timber posts and beams that were key elements of the tunnel support in this reach and that appeared to still be in approximately their original position, and still visible remnants of the original concrete portal structure and railroad bridge abutments immediately behind the portal entrance. Surveys of specific features were conducted utilizing conventional total station equipment and techniques in 2011. In 2013 ground-based LIDAR was utilized to develop 1-foot contours in the study area, as well as to identify the locations and elevations of key features as noted above. Appropriate safety precautions were implemented to protect the survey crews when working near the collapsed tunnel.

The main objective of ground surveys at the adit collapse area was to determine to the extent feasible the dimensions, alignment (i.e., bearing or azimuth) and grade of the visible portion of the tunnel. It was reasoned that this information would provide a check on the tunnel bearing and grade interpreted from published information in McKnight (1974) and unpublished mapping of tunnel geology (Anonymous; date unknown but believed to be circa mid-1950s). The historic and new survey data provided the basis on which a best fit interpretation of portal location, bearing (azimuth) and grade of the St. Louis Tunnel was developed. This interpretation was used to target the initial inclined borings drilled in 2011 and additional inclined borings attempted in 2012 and planned to be drilled in 2013 as discussed in Section 4.0.

Figure 2.1 shows the key data acquired from the 2011 ground survey and an interpreted "best fit" bearing (or azimuth) of the tunnel based on that data. The nominal grade calculated by averaging the top elevations of selected apparently in-place timber posts was 0.9 percent. This is very close to the typical grade constructed in mines of this type and era of about one (1) percent. However, the reliability of this estimate of tunnel grade was judged potentially suspect due to the inherent variability of the ground at the tunnel support post locations (and thus likely variable length of the posts) and the potential that the posts had settled differentially over time under the prior load of colluvium over the tunnel roof. In spite of these uncertainties, drilling of borings AT-02 and BAH-01 in 2011 successfully intercepted the tunnel.

Additional ground survey was performed in 2013, concentrating on spot surveys at the location of the original portal structure (located at and now a portion of the subsequently constructed lime addition structure that is present today). In addition, updated topographic mapping at one-foot contour interval was developed from the ground LIDAR survey. Figure 2.2 provides the updated topographic base mapping developed in 2013. The location and bearing of the tunnel were refined based on the data from the new surveys and the locations at which the tunnel was intercepted by drilling AT-02 and BAH-01 in 2011. The floor grade from the historic tunnel geologic map (found after the drilling in 2011) of approximately 0.3 percent was adopted as the best available information on grade. Note that the approximate locations on the tunnel periphery that were intercepted by AT-2 and BAH-01 were inferred from the drilling data, but are not known with certainty. As a result, the drilling data was not sufficient to check the 0.3 percent grade assumption.

3.0 Field Exploration

3.1 Engineering geologic mapping

A site reconnaissance was performed to identify and map surficial materials (such as fill, alluvium, colluvium, and landslide deposits), and major bedrock units that occur in the vicinity of the overall Rico project site. Prior to the field work, available published geologic mapping and reports were reviewed. The site geologic reconnaissance was performed by traversing the site on foot and mapping key geologic features, exposures and unit contacts on available topographic maps of the site and vicinity. The results of the geologic mapping are discussed in Section 5.0 and shown on Figure 5.1.

3.2 Test pitting

A total of five (5) test pits (TP2011-AT1, -AT-2, -AT-3, -AT-5 and -AT-6) were hand dug in 2011 at the locations shown on Figure 3.1 to acquire representative bulk samples of the colluvium supporting the existing steep and metastable slopes of the excavation in the collapsed adit area. TP2011-AT4 was not dug due to safety issues at its planned location. In addition to acquiring samples for laboratory testing as described in Section 4.1, the in situ density and moisture content of the colluvium was measured utilizing a nuclear density gage at four (4) of the test pit locations (TP2011-AT1, -AT2, -AT5 and -AT6). The results of the field density testing are included in Table 4.1. Note that logs were not developed for these very shallow hand-dug excavations.

Three (3) test pits (TP2013-6, -7 and -8) were excavated with a tracked excavator to depths ranging from 7.0 to 18.5 feet at the locations shown on Figure 3.1 (at the entrance to the terrain trap, adjacent to the open, collapsed reach of the SLT, and in the colluvium in the adjacent slope to the south). The primary objective of these test pits was to provide bulk samples of the colluvium for additional geotechnical testing as described in Section 4.1. Logs and photographs of the test pits are provided in Appendix A and the results of geotechnical testing are included in Table 4.1.

3.3 Drilling

Boreholes were drilled to investigate subsurface stratigraphy, geotechnical properties, and groundwater conditions, and to collect samples for geotechnical laboratory testing, at targeted locations within and adjacent to the open, collapsed reach of the SLT and terrain trap. The boreholes were drilled to the target depths (or refusal if shallower) specified in the original AIP, Supplement to AIP, or 2013 Supplement to the AIP and logged by a professional geotechnical engineer or geologist in general accordance with the guidelines in the Engineering Geology Field Manual (US Bureau of Reclamation, 2001). The logs include information on the following:

- Drilling equipment used
- Difficult or problematic conditions
- Depth of changes in horizons or materials encountered, including color, gradation, soil classification, plasticity, density and moisture
- Other features such as roots, debris, fissures, voids, staining, etc.
- If encountered, the depth to perched or water table groundwater

3.3.1 Drilling equipment and methods

A variety of drilling equipment and methods have been utilized at the site over the past three field seasons in an effort to accommodate the challenging drilling conditions inherent to the colluvial and

alluvial deposits present. The equipment and methods used each season are briefly described as follows.

2011:

- Boart-Longyear C-100 "Minis Sonic" tracked sonic drill rig used for vertical sonic drilling in restricted access locations
- Boart-Longyear 600 C Standard-size tracked sonic drill rig used for vertical sonic drilling in typical access locations and Standard Penetration Test (SPT) and Shelby Tube sampling
- Longyear 45: Skid-mounted core drilling rig used for angled borings advanced using direct mud rotary drilling and casing advance

2012:

- AMS Compact Roto-Sonic 10-C Light-duty small-tracked sonic rig with 2-inch barrel used for angled sonic and mud rotary drilling, and SPT and Shelby Tube sampling (if applicable) in typical surficial deposits on site; used in restricted access locations as needed
- Ditch Witch JT860 and Symmetrix System Small, track-mounted rotary drill rig used for angled air rotary drilling, advancing casing with the Symmetrix casing-advance system
- Central Mining Equipment 85 Large truck-mounted, rotary drill rig used for hollow stem auger (HSA) drilling through typical colluvium and alluvium and mud-rotary drilling (if needed) through cobbles and boulders, with SPT testing and sampling

3.3.2 2011 drilling results

Two drill holes (AT-2 and BAH-01) were completed in 2011 as part of the initial investigations at the adit collapse area. Copies of the boring logs for AT-2 and BAH-01 are included in Appendix A. Detailed narratives of the methods used and conditions encountered in drilling AT-2 and BAH-01 are included in Atlantic Richfield Company (2011a, Part A), and summarized as follows.

AT-2. Drill hole AT-2 was originally planned to be drilled using an air-track rig and the designation of "AT" was retained when the decision was made to drill with a direct mud rotary coring rig instead. The final location selected for this drill hole was in the vicinity of the originally planned AT-2; there was not a drill hole attempted at the AT-1 or other locations envisioned in Atlantic Richfield Company (2011b) due to safety concerns working in the terrain trap. A drilling platform approximately 20 feet by 40 feet was constructed and concrete blocks were stacked on the up-slope side of the platform to prevent rocks rolling down the terrain trap slopes from impacting the drilling platform. A skid-mounted Longyear 45 core drilling rig was positioned on the drilling platform and the drill stem oriented to intersect the St. Louis Tunnel based on the best location information available at that time. Drill hole AT-2 was drilled between October 18 and 21, 2011.

The hole was advanced through colluvium and into the tunnel by mud rotary drilling and advancing HWT casing. At the angle penetrated, the tunnel void was approximately 8.5 feet long. An attempt was made to core into the ground beyond the tunnel with HQ wireline tooling. Steel and wood were encountered that were interpreted as a tie and rail. Once cleared, a further attempt was made to core past the tunnel. It is believed that the hole terminated approximately 7 feet into colluvium beyond the tunnel. The hole was completed with nominal 4-inch diameter HWT casing penetrating into the tunnel. Water level in the tunnel was measured and samples of tunnel water and accumulated settled sludge ("red dog") were sampled through the casing.

BAH-01. Boring BAH-01 was drilled to investigate the thickness of the colluvial material and location of the buried bedrock surface in the vicinity of the St. Louis Tunnel alignment. The boring was oriented to attempt to intercept the St. Louis Tunnel. The location of BAH-01 and orientation of the borehole in

relation to the St. Louis Tunnel alignment are illustrated on Figure 3.1. Drilling was accomplished using the same skid mounted Longyear 44 diamond core rig as for AT-2. The hole was advanced through the colluvium using rotary wash methods. Drilling commenced on October 26 and was completed on November 9, 2011.

Drilling conditions in the colluvium from ground surface to 210 feet (inclined boring length) were very difficult. The difficulties can be attributed to the fact that the colluvium encountered in the borehole was unstable in that portions of uncased hole would typically cave if the drill stem would have to be pulled back from the bottom of the hole for any reason. Another challenge for completion of the borehole was the fact that the colluvium contained blocks of hard bedrock that were very difficult to penetrate to set casing to stabilize the hole. The colluvium was also relatively loose such that larger blocks of bedrock encountered in the colluvium tended to move during drilling and sometimes bind the drill stem. The thickness of the colluvium was unknown prior to drilling. For this reason, careful sampling of the larger bedrock blocks using diamond coring was necessary to determine if the borehole was penetrating intact bedrock or larger blocks of detached bedrock within the colluvium. In addition, installation of casing using a casing shoe (that was required from 147 to 210 feet) could not be accomplished through harder bedrock blocks unless these blocks were predrilled using a diamond core bit and core barrel. The borehole was completed by installing steel casing through the colluvium and into the surface of the bedrock. The casing includes: 1) a larger casing (HWT casing) that extends from the surface to 186 feet; and 2) a smaller casing (HQ rods) that extends from the surface to 210 feet. Both sets of casing were left in the completed boring so that the hole would remain open and accessible for future surveys and sampling as necessary.

Bedrock was encountered between 210 and 240 feet in the boring. The bedrock was sampled by continuous coring. A void zone was encountered between 240 and 252 feet where the boring was terminated. The void was identified by the fact that the drill stem could be advanced by pushing the rods without rotation. When the void was encountered it was suspected to be the St. Louis Tunnel and the rods were pushed for 12 feet in an attempt to determine if drilling could be resumed on the far side of the tunnel. However, bedrock was not encountered within the 12 foot zone suggesting that the drill stem was following the wall of the tunnel rather than penetrating rock on the back (north) side of the tunnel.

After the void was encountered the drill stem was extended approximately five (5) feet into the void and drill fluid was pumped down the drill stem for several minutes in an effort to agitate sediment or precipitate that was thought may be present in the tunnel so that a color change could possibly be detected where the flow from the St. Louis Tunnel daylights in the tunnel collapse reach shown on Figures 5.1 and 5.2. Thirty three minutes after drilling fluids were initially pumped into the tunnel a distinct red color change was noted in the St. Louis Tunnel discharge.

3.3.3 2012 drilling results

A total of five (5) borings were drilled at the locations shown on Figure 3.1 during the 2012 field season. The drilling method used and results obtained for each of these borings are described below. Standard 2-inch nominal Schedule 40 PVC open tube wells were installed in selected borings as noted below, utilizing 0.010-inch machine-slotted screen with silica sand pack or pre-pack screens (as noted on the logs). Boreholes not completed as monitoring wells were backfilled using a fluid cement/bentonite grout unless otherwise noted on the logs. Logs for these borings are provided in Appendix A.

MW-202. Boring MW-202 was completed within the terrain trap near boring AT-2. This boring was advanced using the sonic drilling method. MW-202 encountered 2 feet of sandy and silty gravel fill at the surface, followed by layered sandy gravel colluvium with variable silt and clay content to the maximum depth of exploration (38.8 feet). Selected intervals of the sonic core recovered were saved as bulk samples for laboratory testing as described in Section 4.0. A 10-foot-long well screen with sand

pack was placed at the bottom of the hole, and then the remainder of the hole was backfilled with a grout seal.

MW-204. Boring MW-204 was drilled at the west end of the open, collapsed portion of the SLT utilizing the sonic drilling equipment. MW-204 encountered mostly sandy gravel colluvium with variable silt and clay content from the surface to the maximum depth of exploration (31.5 feet). A 15-foot long well screen and sand pack were set at the bottom of the hole, followed by a grout seal to the ground surface. Selected intervals of the sonic core recovered were saved as bulk samples for laboratory testing as described in Section 4.2.

CHV-101S. Boring CHV-101S was drilled on the north side of the open, collapsed portion of the SLT, between MW-202 and MW-204. This boring was advanced using the HSA drilling technique with SPTs performed in situ on approximately 2.5-foot intervals to 30 feet, with a final SPT taken at 45 feet. SPT samples were recovered for laboratory testing as discussed in Section 4.2. Loose, clayey sand fill was encountered from grade to 7.5 feet, followed by mostly silty and clayey sand and gravel colluvium (medium-dense increasing to extremely dense) to refusal on boulders at 29.0 feet. The boring was then offset 6 feet east, blank drilled to 30 feet, then advanced through layered gravel, cobbles, and boulders, again to refusal at 48 feet. It was then decided to terminate the boring, and complete it as an open tube monitoring well with a 10-foot-long well screen and sand pack at the bottom, with a grout seal to the ground surface.

CHI-102 and **-102B.** Boring CHI-102 was intended to be completed as an angle boring through the colluvium to intercept intact bedrock in the SLT east of the colluvial reach of the tunnel. The boring was drilled from a prepared drilling pad approximately 175 feet north of the tunnel. The boring was completed with compressed air as the drilling fluid, using a down-hole hammer/casing assembly. From the surface, and on an initial 22.2 degree down-angle, silty gravel and sand was observed in the cuttings to 5 feet, followed by silty sand with sandstone and shale fragments to 23 feet. From 23 to 38 feet, silt with fragments of altered sandstone was observed. At 38 feet, the welded casing shoe broke off of the casing and the hole was terminated. The casing was left in place.

Boring CHI-102B was a second attempt at the same target as for CHI-102, and was offset 2 feet to the east. The boring extended to 65 feet (at a similar down angle of 21.4 degrees). In a matrix of sandy silt colluvium, fine-grained sandstone chips were observed to 47.5 feet, followed by a boulder from 47.5 to 51.5 feet. From 51.5 to 65 feet, sandstone, quartz, and pyrite fragments were observed in a matrix of sandy silt colluvium. A similar casing/casing shoe problem occurred and the boring was terminated at 65 feet. The casing was left in place.

3.3.4 2013 drilling results

A total of five (5) primary vertical borings were completed during the 2013 field season (MW-201, -203, -205, -207 and CHV-101D). Two (2) additional borings (CHV-101M and -101U) were drilled immediately adjacent to CHV-101D to install monitoring wells with screens in perched aquifers encountered during the drilling of CHV-101D. The locations of these borings are shown on Figure 3.1 and logs are included in Appendix A.

MW-206. One additional vertical boring (MW-206) was originally planned as noted in the 2013 Supplement to the AIP. A decision was made to delete MW-206 from the 2013 field investigation program given the successful results from the other 2013 borings completed, the results of the nearby 2013 surface geophysical profiling (see Section 3.5), and information acquired from other drilling in the vicinity during prior field investigations.

CHI-101 and -102C. Two (2) inclined borings (CHI-101 and -102C), and possibly a third inclined boring (CHI-103) pending results of the first two borings, were originally planned as described in the 2013 Supplement to the AIP. These borings were primarily intended to supplement information within the

rock portion of the existing SLT acquired from boring BAH-01 in 2011 to support a hydraulic control measures alternative involving tunneling or large-diameter horizontal drilling to rock. Boring CHI-101 was drilled to 113 feet, encountering the same extremely challenging drilling conditions in the colluvium as found in BAH-01, CHI-102 and CHI-102B. The planned start of drilling of boring CHI-102C was delayed due to weather-induced instability found in the access road and drill pad on the north side of the terrain trap prior to mobilizing the drill rig to that location. Given the recommendation in the Preliminary Design Report, St. Louis Tunnel Hydraulic Control Measures (subsequent to submittal of the 2013 Supplement to the AIP) to proceed with an alternative for hydraulic control measures that does not involve tunneling or horizontal boring, and with weather conditions deteriorating and safety concerns rising, a decision was made to terminate boring CHI-101 at 113 feet, and not to drill boring CHI-102C (or CHI-103) during the 2013 field season.

3.4 Downhole geophysical logging

All five (5) of the borings completed during the 2013 field investigation and two borings completed in 2012 (MW-202 and -204) were logged with a suite of downhole geophysical tools after the drilling and well installation were completed. The tools utilized included borehole video (for casing assessment), and natural gamma, conductivity, and thermal neutron (for stratigraphy, lithology and saturation).

The downhole geophysical logging was performed by the COLOG Division of Layne Christensen between October 22 and 24, 2013. The downhole logging was performed by lowering the selected tool down the PVC casing within the borehole by a multi-conductor cable connected to a motorized winch. The data collected during the survey was transmitted to a computer and graphical display and reviewed by the geophysical-logging specialist in real time. This allowed for the geophysical-logging specialist to verify that the tools were operating as expected and make appropriate adjustments to the surveys as necessary to meet the data collection objectives.

3.5 Surface geophysical profiling

Surface geophysical profiling was performed by GEI Consultants, Inc. as part of the 2013 field investigation program utilizing two complementary techniques to supplement the results of borings and test pits. The techniques employed were refraction microtremor (ReMi) and electrical resistivity (ER). Each of these techniques is discussed in the following subsections.

3.5.1 Refraction microtremor

ReMi profiles record ambient vibrations from nearby sources such as moving vehicles and equipment that result in shear and compression wave returns from subsurface materials to a linear array of geophones placed on the ground surface along the profile to be explored. These returns are assembled into a response spectrum that is analyzed by computer to evaluate shear and compression wave velocities (and thereby an index of density) of overburden materials and the approximate depth to interfaces of materials of varying density (e.g., competent strata such as intact bedrock).

A series of geophones were placed on the ground in arrays at a spacing appropriate to the depth of exploration desired. Where multiple spreads were performed to create a long line, the last several geophones were left in place and utilized to create overlap between adjacent spreads. This overlap is necessary to fill in data gaps near profile edges when creating continuous two-dimensional sections on longer lines. Once collected, the data were checked for their fidelity. To assure that a robust profile was being made, both individual recordings and multiple summed (stacked) recordings were evaluated.

A wave field transformation data processing technique and an interactive Rayleigh-wave dispersion modeling tool were employed for the spectral analysis of surface waves. By analyzing segments of the geophysical line and integrating the results, two-dimensional profiles were developed along the seismic

line arrays. The purpose of the two-dimensional profiles was to provide details of the shear wave velocities along the array length to the greatest depths possible.

A total of seven lines of seismic data were collected for ReMi processing from September 25 through October 1, 2013. The locations of these lines as surveyed by Anderson Engineering Company, Inc (AECI) are shown on Figure 3.1. RM-201 through RM-204 were aligned to provide overall areal coverage of the colluvium and alluvium overlying bedrock at some depth at and in the vicinity of the collapsed adit and terrain trap. These alignments were constrained to avoid excessively steep slopes that complicate the interpretation of the field data. The three shorter ReMi lines (RM-205A, -205B, and -205C) located within the terrain trap were aligned to attempt to locate the St. Louis Tunnel and supplement the locations confirmed to date at AT-2 and BAH-01. The results of the ReMi profiling are presented in Appendix A.

3.5.2 Electrical resistivity

Where conditions are susceptible, ER profiling can be used to image unconsolidated sediments/layering, groundwater interfaces of sufficiently contrasting electrical conductivity (due to dissolved mineral chemistry), near-surface geologic stratigraphy, and air/water-filled and clay-filled voids. These features represent zones of variable electrical conductivity, and by mapping the flow of electrical current throughout the subsurface, it is possible to image the lateral and vertical distribution of these features. The objectives of the ER profiling at the open, collapsed reach of the SLT and adjacent ground were to: 1) further characterize the nature and stratigraphy of the colluvium and alluvium underlying the area; 2) identify the approximate depth to saturation within the colluvium (whether due to perched or water table conditions); and 3) to the extent feasible, assess the presence of partial saturation that might indicate water exiting the SLT and seeping into the colluvium.

ER profiling was performed by transmitting a very low amperage direct current (DC) electrical current into the subsurface between stainless steel electrodes spaced equally along a profile. The subsurface current flow was mapped by measuring the electrical potential at the ground surface using a high-sensitivity resistivity meter. Resistivity profiles were positioned for the greatest allowable profile length to facilitate depth of investigation and desired resolution. The longest single profile utilized a10-foot electrode spacing; a 5-foot electrode spacing was used on the shorter lines. A maximum exploration depth of approximately 45 to100 feet was targeted using these electrode array lengths. Elevation changes over the length of the deployed resistivity array were picked from the location surveys and existing 1-foot contour topographic mapping and used in the data reduction process.

Four lines of ER profiling (RS-201, RS-202, RS-203, and RS-204) were performed in and adjacent to the open, collapsed reach of the SLT from September 25 through October 1, 2013. As shown on Figure 3.1, these lines were located adjacent to the ReMi lines. The results of the ER profiling are presented in Appendix A.

3.6 Groundwater level monitoring

All of the borings completed as monitoring wells were developed by bailing or surging to clear the well casing and screen of drilling fluid and settled cuttings. Water levels are periodically monitored in accordance with the requirements in the Sampling and Analysis Plan for Surface Water and Groundwater (Atlantic Richfield Company, 2013c). Groundwater level readings to date are presented in Table 3.1.

4.0 Geotechnical Laboratory Testing

4.1 Test methods and results - 2011

Bulk samples acquired from the hand dug test pits described in Section 3.2 were tested for gradation, plasticity (Atterberg limits) and laboratory moisture/density relationship (i.e., Proctor density). The results of the laboratory testing are included in Table 4.1; laboratory data sheets for this testing are provided in Appendix B. The results of the field density/moisture content testing are included with the laboratory testing results in Table 4.1 and in Appendix A.

Three (3) of the samples tested classify as non-plastic to very low plasticity silty gravel with sand; one sample tested as low plasticity clayey gravel with sand; and the other sample was slighty plastic silty, clayey sand with gravel. The percent fines of the minus 3 to 4 inch fraction of these samples ranged from 13 to 23 percent, averaging 19 percent. Corrected maximum dry density of these samples ranged from 127.2 to 138.0 pcf with optimum moisture contents ranging from 7.6 to 9.3 percent. The in situ density and moisture content from nuclear gage testing ranged from 97.5 to 118.0 pcf and 11.7 to 15.8 percent, respectively. Based on these laboratory moisture-density (i.e., Proctor) test and nuclear gage in situ density results, the near surface colluvium forming the steep excavation slopes in the terrain trap is loose to very loose (relative compaction in the range of only 73-88 percent).

One additional sample from the terrain trap slopes (identified as "St. Louis Adit/cut above adit") was acquired sometime before 2011 and tested for gradation and Proctor density. This sample classified as sandy gravel with only 8 percent fines. The maximum dry density and optimum moisture content of this sample were 133.3 pcf and 7.5 percent, respectively, similar to the 2011 results noted above.

4.2 Test methods and results – 2012

Bulk samples acquired from sonic drilling samples (borings MW-202 and MW-204), and soils recovered from SPTs taken in boring CHV-101S were tested for gradation and plasticity. The results of the laboratory testing are included in Table 4.1; laboratory data sheets for this testing are provided in Appendix B.

The moisture content of the near-surface fill ranged from 12 to 18 percent; and in the underlying native colluvium generally 8 to 18 percent (up to 36 percent at 25 feet depth in MW-202). Samples of the smaller gravel (i.e., ¾-1 inch minus) through fines fraction of the colluvium recovered from Standard Penetration Tests (SPT) in CHV-101S and sonic cores from two other borings (MW-202 and MW-204) classify as non- to very slightly plastic, silty to locally very slightly clayey sand and gravel. Fines in these samples ranged from 2.6 to 29.6 percent, with an average of 13.7 percent (and only 2 of 17 samples less than about 8 percent).

5.0 Site Characterization

This section of the report describes the condition of the St. Louis Tunnel, the local geologic setting, the characteristics of the geologic units present, and groundwater conditions in the area relevant to the hydraulic control measures under consideration as documented in the Preliminary Design Report, St. Louis Tunnel Hydraulic Control Measures (Atlantic Richfield Company, 2013b).

5.1 St. Louis tunnel

The investigations documented in this report focused on the portion of the SLT that was originally driven through approximately 330 feet of colluvium at the base of CHC Hill, and then into bedrock of the Hermosa Formation to just beyond the reach that was reportedly lagged (i.e., approximately 35 feet into the rock from the contact with colluvium). Based on archival tunnel geologic mapping and historic photographs, it is inferred that the tunnel is nominally seven (7) feet high and nine (9) feet wide. It is important to note, however, that these are nominal dimensions and the actual width and especially the height could vary significantly (up to at least a foot or more depending on over-breaks, support installation, and possible local over-excavations).

Available aerial photographs show that a major excavation was made over the downgradient reach of the SLT sometime between August 1950 and October 1952. It is speculated that this was to reduce the overburden stress on the timber supports in the colluvial section of the tunnel and reduce what was likely a frequent need to repair or replace support (based on anecdotal discussion in McKnight, 1974). The resultant steeply sloping U-shaped excavation is now referred to as the "terrain trap". The slopes in this area are excessively steep and judged at best metastable to unstable near surface at their angle of repose. Cobble- and boulder-size rocks roll and tumble down these slopes, especially following rainfall and snowmelt events. Finer (sand and gravel fraction) colluvium also continues to be transported down slope by gravity, accumulating at the toes of the slopes. It has been observed that approximately 2-4 feet of colluvial debris (including cobbles and boulders) have accumulated behind a 4-foot high "jersey barrier" wall placed in the terrain trap in October 2011.

Review of subsequent aerial photography is interpreted to show that the remaining ground over this reach of the tunnel remained relatively undisturbed until at least August 1989, except that raveling of the slopes removed the benches visible shortly after the initial excavation. An informal discussion with one of the Anaconda Minerals Company mining engineers as reported by Sandy Riese (Personal communication, 2013) confirmed that the portion of the tunnel through the colluvial section was in good condition with adequate timber support as late as approximately 1985. Sometime later, inferred by review of available aerial photography as before September 1998, it appears that someone borrowed the remaining colluvial cover over the first approximately 250 feet of the tunnel in-by the original portal location. In this reach, the back (i.e., the roof) of the tunnel is now mostly gone and the tunnel is partially filled with damaged and displaced timber supports and what is assumed to be displaced colluvium ranging from silty sand to cobbles and boulders. The upper end of the now "open, collapsed" portion of the tunnel is blocked by a boulder at least seven (7) feet in visible dimension and water currently begins emerging at the surface at this point. It is inferred that the next approximately 60 feet of the tunnel upgradient in the colluvial section is at least partially plugged with displaced colluvium and broken timber supports. This inference is based primarily on the observation that boring AT-2 appears to have penetrated the tunnel in a relatively open reach, but encountered water filling the tunnel to the back. Without a leaky blockage, the average tunnel flows would be on the order of well less than a foot deep above the tunnel floor. This reach, estimated to be up to approximately 70 feet long, is referred to as the "debris plug". It is not known if there is additional debris plugging some or all of the remaining

approximately 60 feet of the tunnel in the colluvial reach to the contact with Hermosa Formation bedrock.

5.2 Site geology

An interpretation of the geologic conditions in the vicinity of the St. Louis Tunnel portal and adit collapse area is shown in plan on Figure 5.1 and in profile along the St. Louis tunnel centerline on Figure 5.2. This interpretation is based on surface geologic mapping of the slope conditions located upslope and in the vicinity of the tunnel alignment and the results of the exploratory drilling, test pitting, and surface geophysical surveying completed to date (see Figure 3.1 for locations of exploratory features). An exposure of bedrock consisting of the Lower Hermosa Formation was mapped several hundred feet upslope of the tunnel portal area. The bedrock in this exposure consists of a bedded sequence of sandstone and siltstone defined by both outcrops and subcrops (areas where the material has broken off or is derived from in-place outcrops but probably not moved more than a few feet from its original location) and therefore marks the approximate location of intact bedrock at the ground surface above the tunnel.

There is also a small localized active landslide located in the slope above the collapsed tunnel entrance area. The surface expression of the slide suggests that it is shallow (<10 feet) and has not moved in the past several years. The reminder of the area located above and adjacent to the adit collapse area is covered by coarse colluvial material containing abundant boulder size blocks of displaced bedrock. As seen on Figure 5.1, the colluvium is locally covered to the north of the adit collapse area (northwest of the terrain trap) by the Soil Lead Repository constructed in 2009.

5.3 Geologic units

5.3.1 Colluvium

The colluvium in the vicinity of the collapsed and debris-plugged reach of the SLT is described as a heterogeneous mixture of relatively loose soil and rock ranging from predominantly non- to occasionally very slightly plastic fines (finer than the USCS No. 200 sieve), to "boulders" (typically subangular blocks of sedimentary Hermosa Formation and intrusive igneous rock) at least as large as 20 feet where visible and encountered in borings to date.

5.3.2 Bedrock

Where encountered in boring BAH-01 at and just beyond the contact with colluvium, the bedrock is comprised of Hermosa Formation. In this reach, the Hermosa Formation is characterized by interbedded, fine-grained, medium greenish gray sandstone and medium dark gray siltstone that is hydrothermally altered and mineralized with finely disseminated pyrite. The approximately 25 feet of rock cored is typically moderately hard, weak to at most moderately strong, and closely fractured. Locally the bedrock sequence is cut by shear zones where the rock is closely to intensely fractured and contains clay gouge (i.e., fault gouge). A prominent quartz vein several inches thick and pockets of pyrite and quartz were also encountered. Core recovery in this reach ranged from 20 to 100 percent, averaging about 66 percent. Rock quality designation (RQD) was zero except for one 5-foot run with an RQD of 38 percent. Based on archival geologic mapping of the SLT, it appears that the quality of the bedrock likely improves approximately 35 feet beyond the colluvial contact where lagging and prominent mineralized veins are indicated as ending and "massive sandstone" is encountered.

6.0 References

- Atlantic Richfield Company. 2011a. Investigations, Analyses and Evaluations (Part A Engineering Geologic and Geotechnical Field Investigations and Laboratory Testing, Part D Adit and Portal Investigation Report). Rico-Argentine Mine Site Rico Tunnels Operable Unit OU01, Rico, Colorado; submitted to US EPA, Region 8, Denver, CO. December 30.
- Atlantic Richfield Company. 2011b. Investigation Plan for Collapsed Adit Area at St. Louis Tunnel, Rico-Argentine Mine Site Rico Tunnels Operable Unit OU01, Rico, Colorado; submitted to US EPA, Region 8, Denver, CO. August 29.
- Atlantic Richfield Company. 2012. Supplement to Investigation Plan for Collapsed Adit Area at St. Louis Tunnel, Rico-Argentine Mine Site Rico Tunnels Operable Unit OU01, Rico, Colorado; submitted to US EPA, Region 8, Denver, CO. July 3.
- Atlantic Richfield Company. 2013a. Supplement to Investigation Plan for Collapsed Adit Area at St. Louis Tunnel, Rico-Argentine Mine Site Rico Tunnels Operable Unit OU01, Rico, Colorado; submitted to US EPA, Region 8, Denver, CO. May 31.
- Atlantic Richfield Company. 2013b. Preliminary Design Report, St. Louis Tunnel Hydraulic Control Measures, Rico Argentine Mine Site, Rico Tunnels Operable Unit OU01, Rico, Colorado. October 30.
- McKnight, E.T. 1974. *Geology and Ore Deposits of the Rico District, Colorado*: U.S. Geological Survey Professional Paper No. 723.
- U.S. Bureau of Reclamation. 2001. *Engineering Geology Field Manual, Second Edition, Volume II;* U.S. Department of the Interior, Bureau of Reclamation.
- U.S. Environmental Protection Agency (EPA). 2011b. Removal Action Work Plan. Rico-Argentine Mine Site Rico Tunnels Operable Unit OU01, Rico, Colorado. March 9.

Tables

Table 3.1: Groundwater Elevations

Well Completion	Location													
Data														
Date													1	
Measured	AT-2	BAH-01	CHV-101D	CHV-101M	CHV-101S	CHV-101U	MW-201	MW-202	MW-203	MW-204	MW-205	MW-206	MW-207	
Top Casing Elevation	8,866.2	8,912.6			8,858.9			8,859.2		8,866.0			'	
Bottom of Casing Elevation														
Measuring Point (MP) Elevation														
Top of Screen Elevation														
Bottom of Screen Elevation														
11/27/2012					8,822.4			DRY		8,852.1				
12/18/2012								8,824.2						
1/4/2013										8,851.6				
1/24/2013								DRY		8,851.0				
2/7/2013										8,851.3				
2/8/2013	8,859.9													
3/13/2013	8,860.0									8,850.5				
4/3/2013	8,854.4									8,850.6				
4/24/2013								8,825.6						
5/16/2013										8,850.5				
5/21/2013														
5/22/2013	8,859.4				8,810.9			8,824.5						
6/12/2013	8,859.7				8,822.7			8,824.6						
6/13/2013										8,850.4				
7/19/2013	8,859.8				8,821.7			8,826.8		8,850.6			<u> </u>	

Notes

All blank entries represent no data collected on that day

All readings in feet above mean sea level

Table 4.1: Geotechnical Laboratory Testing Results

											Labar	-1				D:	1					
Sample Location/Type		Index Properties				Cradation		Atterberg Limits		Laboratory Compaction		Field Compaction			Direct Shear Strength		h Soil Classification					
Sample	Location/15	/pe	inde	x Properti	es		Gradation 	1	Atterber	g Limits	Comp	action	FI	leia Com I	paction	Snear	Strength		301	Classification		
			Natural																			
			Moisture			Gravel		Fines														
Boring/	Depth	4	Content		Specific		Sand	< #200	LL	PI	MDD ²	OMC ²	DD	MC	Compaction	φ'	c'	Field	Lab			
Test Pit	(ft)	Type ¹	(%)	(pcf)	Gravity	(%)	(%)	(%)	(%)	(%)	(pcf)	(%)	(pcf)	(%)	(%)	(°)	(psf)	Classification	Classification	Lab Description		
AT-2													Samples A									
BAH-01 CHV-101D													Samples <i>I</i> ting In Pro									
CHV-101D	2.5-4	SS	12.5	_	_	24	46.4	29.6	_ [_	_	168	ling in Pi	I		_	l _	SC	<u> </u>	1		
CHV-101S	5-6.5	SS	11.9	_	_	-	-	-	_		_					_	_	SC	_			
CHV-101S	7.5-9	SS	7.9	-	-	-	-	13.8	-	-	-	-				-	-	SM-GM	-			
CHV-101S	10-11.5	SS	8.8	-	-	-	-	-	-	-	-	-				-	_	SM-GM	-			
CHV-101S	12.5-14	SS	14.9	-	-	40	42.6	17.4	NV	NP	-	-				-	-	SC	-			
CHV-101S	15-16.5	SS	14.8	-	-	-	-	-	-	-	-	-				-	-	SC	-			
CHV-101S	17.5-19	SS	12	-	-	-	-	-	NV	NP	-	-				ı	-	SC	-			
CHV-101S	20-21.5	SS	12.9	-	-	-	-	-	-	-	-	-				-	-	CL	-			
CHV-101S	22.5-23.5	SS	15.9	-	-	-	-	-	NV	NP	-	-				-	-	GC	-			
CHV-101S	27.5-29	SS	9.8	-	-	-	-	14	-	-	-	-				-	-	GM	-			
CHV-101S CHV-101S	30-31.5 45-46.5	SS SS	11.8 10.3	-	-	-	-	15.3	-	-	-	-				-	-	GC SC	-			
EW-1	45-46.5	33	10.5	-	-	-	-	13.3	-	-	-	-				-	-	30	-			
EW-2A																						
MW-201	Testing In Progress																					
MW-202	0-1.5	SONIC	19	-	-	57	30	13	NV	NP	-	-				-	-	GM	-			
MW-202	1.5-6	SONIC	20	-	2.65	35	40	25	30	21	128	9				-	-	SC	-	Clayey Gravel With Sand		
MW-202	6-9	SONIC	14.1	-	-	-	-	-	-	-	-	-				-	-	GW-GC	-			
MW-202	9-12	SONIC	18.2	-	-	-	-	-	-	-	-	-				-	-	SC	-			
MW-202	12-18	SONIC	24	-	2.65	20	70.7	9.3	30	21	125.1	10.4				-	-	SW-SM	-	Poorly graded Sand with Clay and Gravel		
MW-202	18-23	SONIC	13.1	-	2.65	20	70.7	9.3	30	21	125.1	10.4				-	-	SW-SM	-	Poorly graded Sand with Clay and Gravel		
MW-202	23-30	SONIC	36	-	2.65	20	70.7	9.3	30	21	125.1	10.4				-	-	SW-SM	-	Poorly graded Sand with Clay and Gravel		
MW-202 MW-203	30-35.5	SONIC	9.7	-	_	-	-	-	-	-	-	- Too	ting In Da			-	_	SW-SM	-			
MW-204	0-7	SONIC	7.9		2.65	74	23	3	_		125.9	9.9	ting In Pro	ogress I				GW		1		
MW-204	7-10.5	SONIC	9.7		2.65	-	-	-	29	10	125.9	9.9						GW-GC				
MW-204	10.5-12	SONIC	9.4	_	2.65	67	30.4	2.6	-	-	125.9	9.9				-	_	GW	_			
MW-204	12-15	SONIC	14.4	-	2.65	-	-	-	29	10	125.9	9.9				-	_	GW-GC	-			
MW-204	21-25.5		16.6	-	2.65	54	38.4	7.6	-	-	125.9	9.9				-	-	GW-GM	-			
MW-205													ting In Pro									
MW-206													ting In Pro									
MW-207		1		1		1					1 1	Tes	ting In Pro	ogress			1		T	1		
SSR-103		DIIII				40	40	0			400.0	7.5										
St. Louis Adit TP-2004A	ut Above Ad	BULK	-	-	-	49	43	8	-	-	133.3	7.5	-			-	-	-	-			
TP-2004A TP-2004B													-									
TP-2004B	0-2	BULK	_	_	2.65	32	45	23	24	6	127.2	9.2	97.5	12.8	77	-	_	_	SC-SM	Silty Clayey Sand With Gravel		
TP2011-AT2	0-2	BULK	-	-	2.65	46	37	17	21	NP	138	7.6	100.8	11.7	73	-	_	-	GM	Silty Gravel With Sand		
TP2011-AT3	0-2	BULK	-	-	2.65	49	38	13	-	-	135.6	8.2	1	1	. •	-	_	-	GM	Silty Gravel With Sand		
TP2011-AT4				1		-	-	-					Samples A	Aquired			1	1				
TP2011-AT5	0-2	BULK	-	-	2.65	50	31	19	35	8	133.4	8.4	118.0	15.8	88	-	-	-	GM	Silty Gravel With Sand		
TP2011-AT6	0-2	BULK	•	-	2.65	40	38	22	32	11	130.1	9.3	109.3	14.8	84	1		-	GC	Clayey Gravel With Sand		
TP2011-17			-	-				-								-						
TP-17																						
TP-18																						
TP-22													<u> </u>									
TP2013-6												Гes	ting In Pro	ogress								

Table 4.1: Geotechnical Laboratory Testing Results

Sample	Sample Location/Type Index Pro				es	Gradation			Atterberg Limits		Laboratory Compaction		Field Compaction			Direct Shear Strength		Soil Classification			
Boring/	Depth		Natural Moisture Content	_	Specific	Gravel > #4	Sand	Fines < #200	LL	PI	MDD ²	OMC ²	DD	MC	Compaction	ф'	c'	Field	Lab		
Test Pit	(ft)	Type ¹	(%)	(pcf)	Gravity	(%)	(%)	(%)	(%)	(%)	(pcf)	(%)	(pcf)	(%)	(%)	(°)	(psf)	Classification	Classification	Lab Description	
TP2013-7												Tes	ting In Pr	ogress		-					
TP2013-8												Test	ting In Pr	ogress							

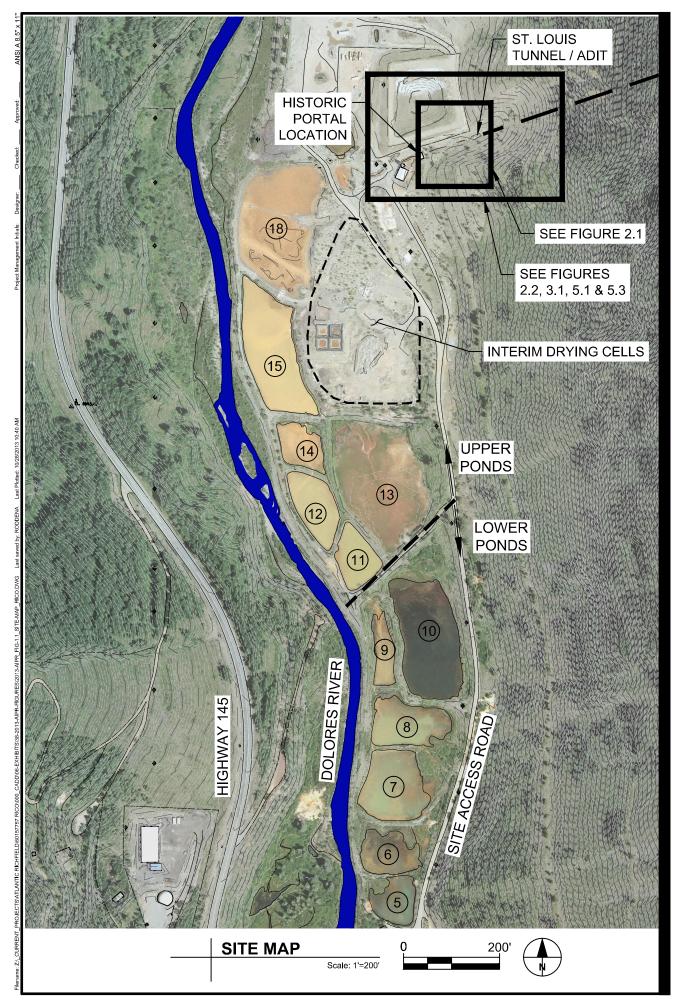
Notes:

¹SS - Split spoon; SONIC - Sonic core; BULK - Composite grab sample

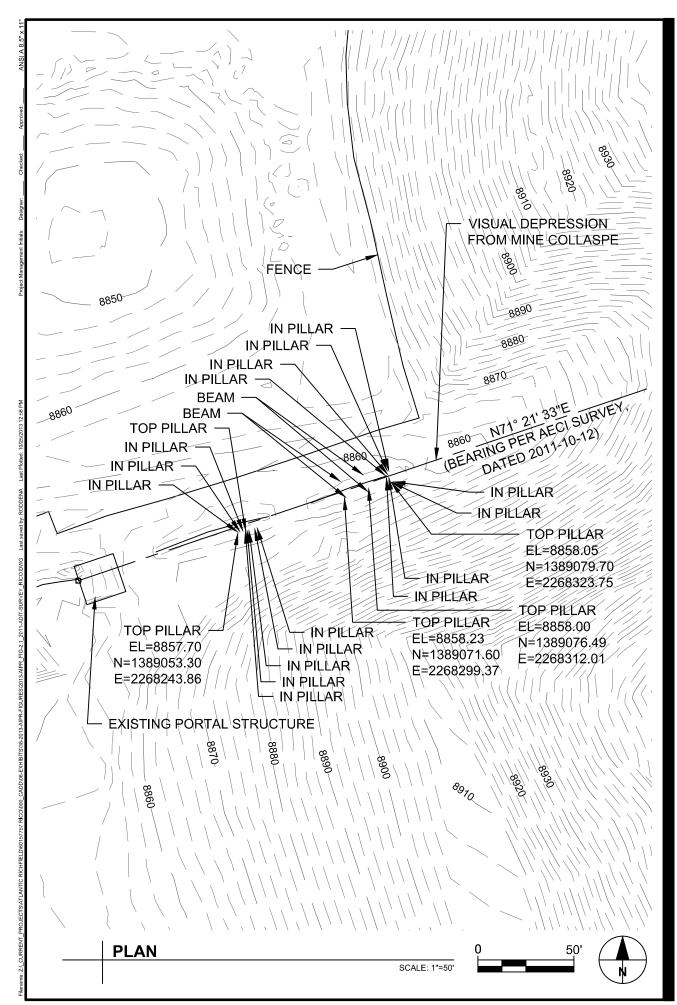
²Maximum Dry Density (MDD) and Optimum Moisture Content (OMC) per ASTM D698, unless otherwise noted.

³Tested per ASTM D1557

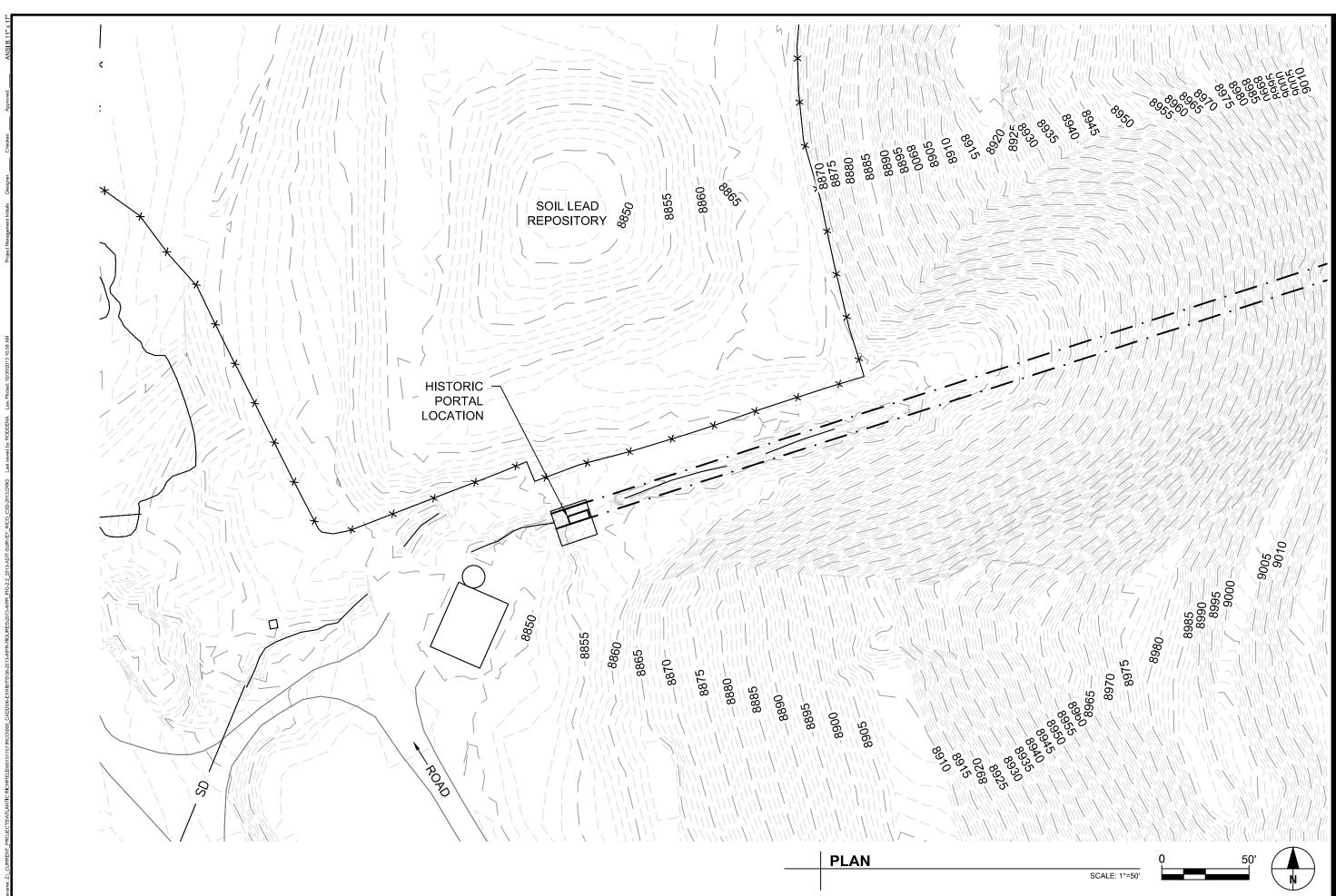
Figures



ADIT AND PORTAL INVESTIGATION REPORT – 2013 UPDATE A=COM SITE MAP 60306687

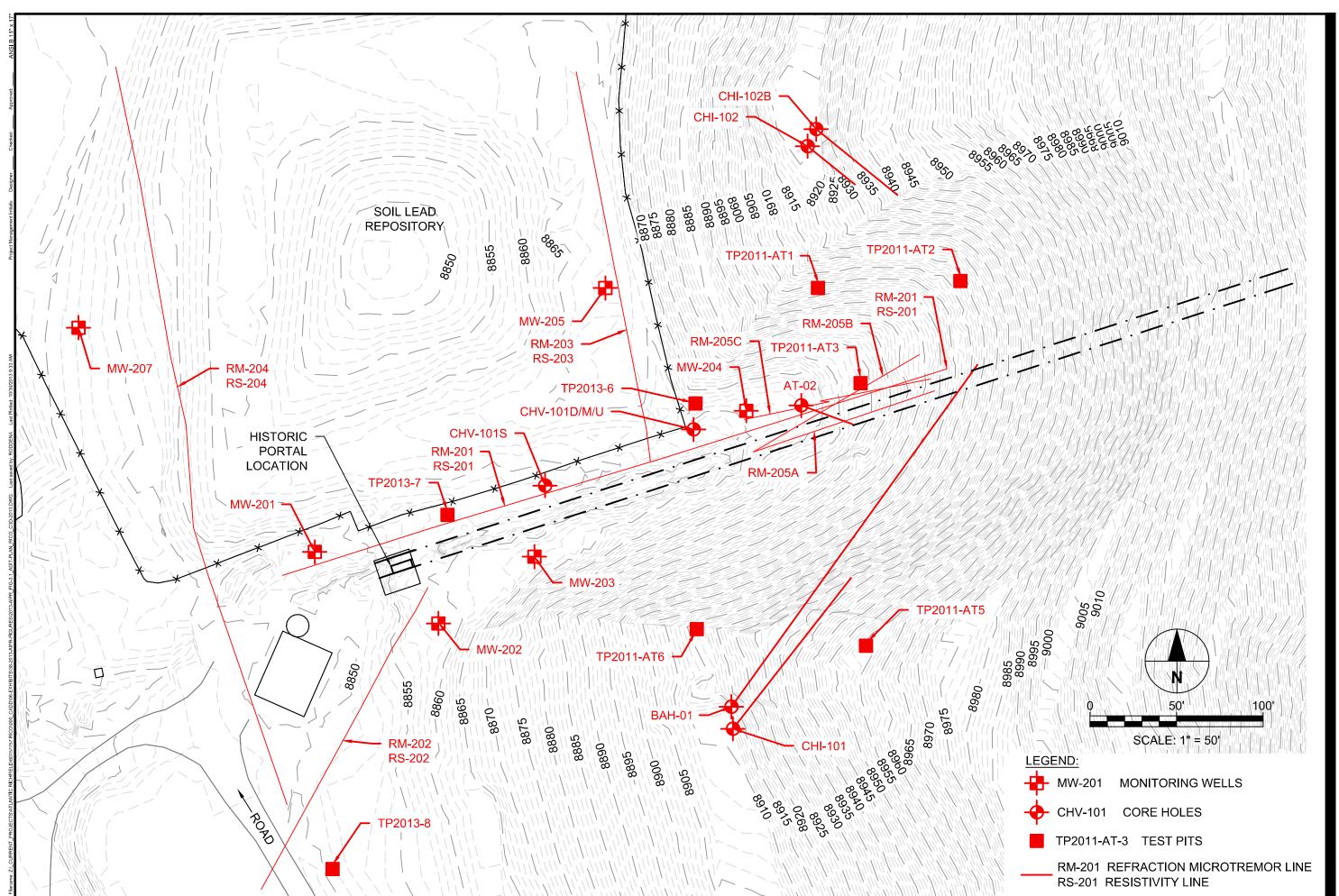


ADIT AND PORTAL INVESTIGATION REPORT - 2013 UPDATE A=COA 2011 SURVEY OF COLLAPSED ADIT AREA 603066

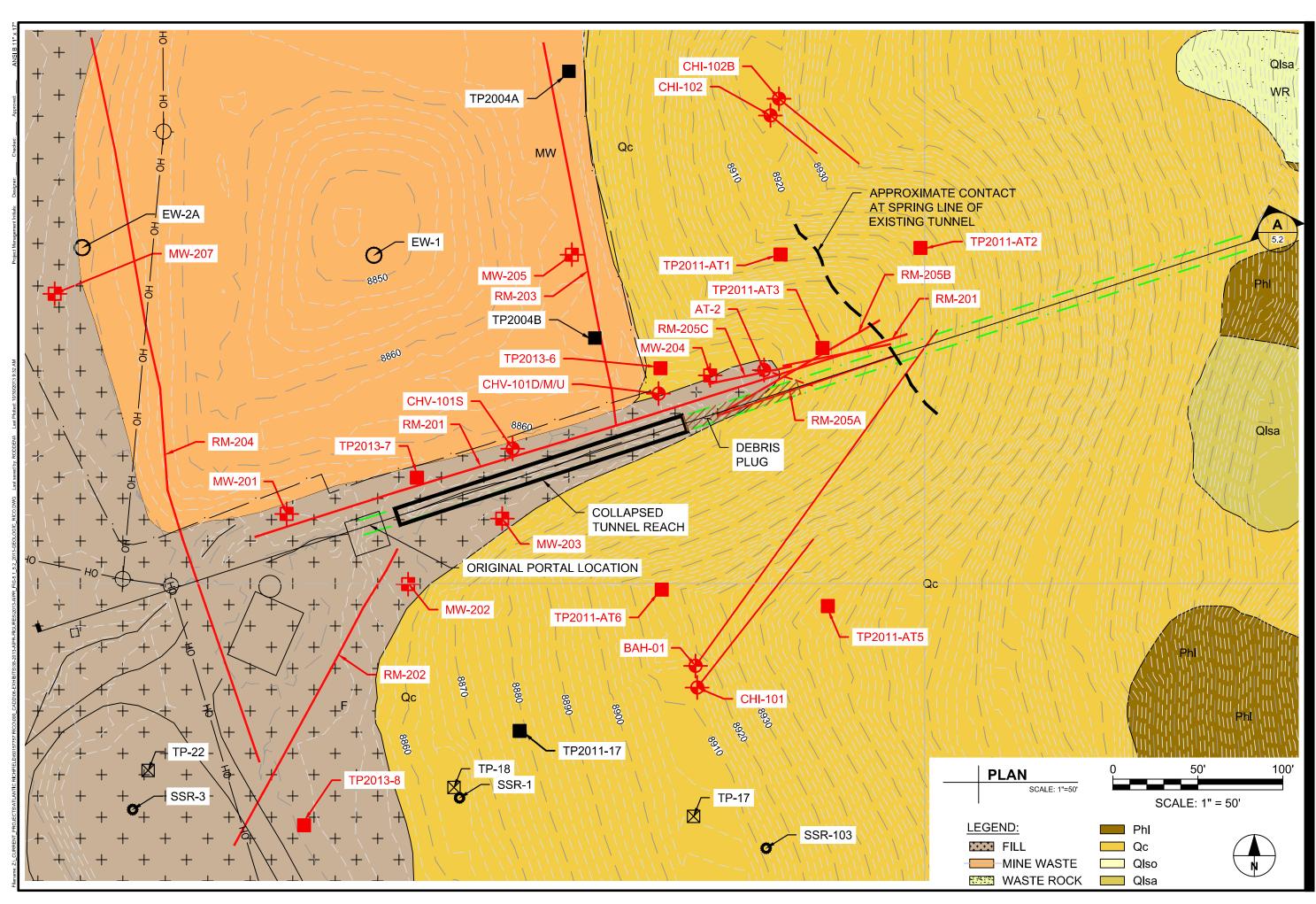


A=COM ADIT AND PORTAL INVESTIGATION REPORT - 2013 UPDATE

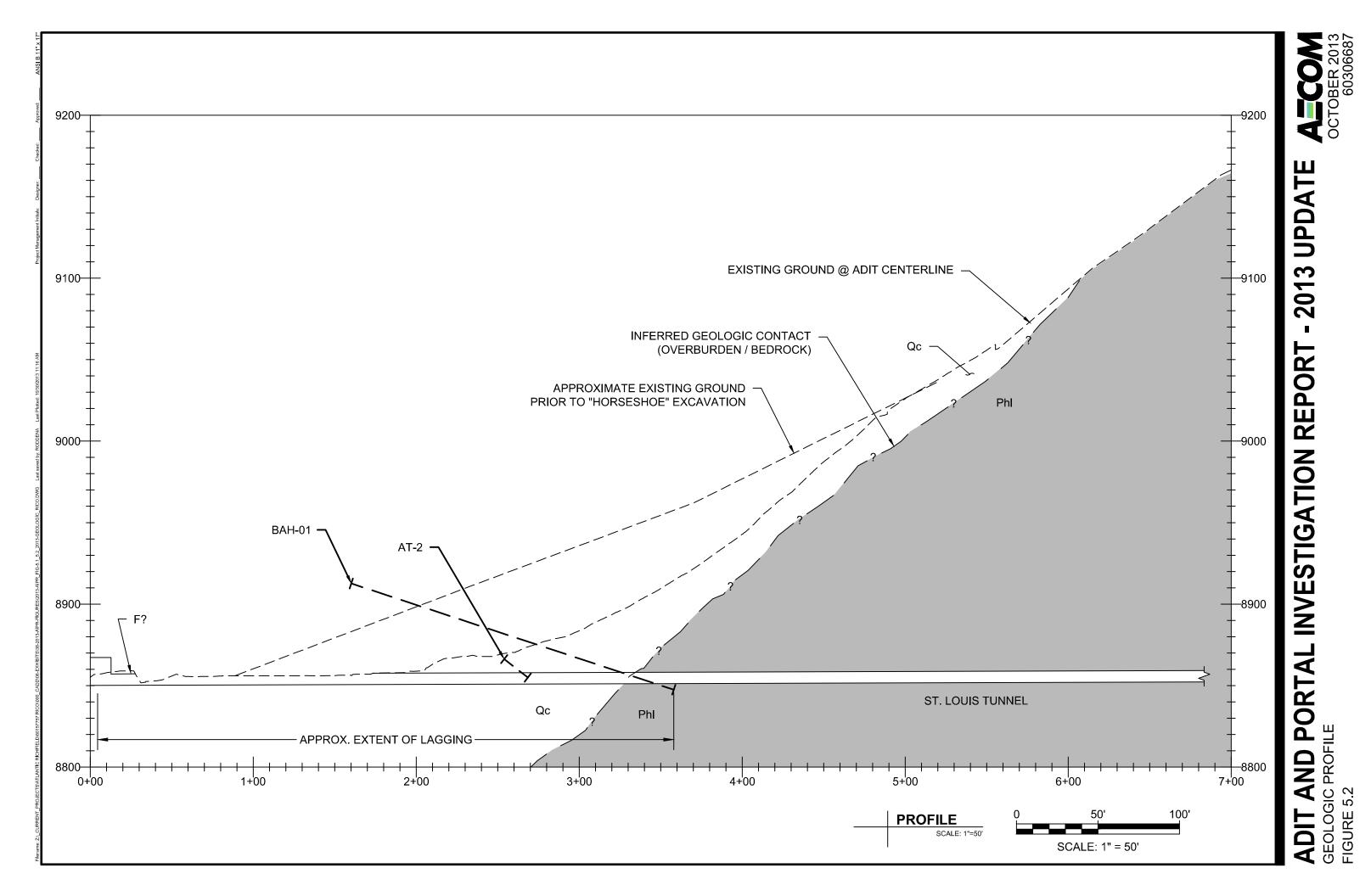
2013 SURVEY OF COLLAPSED ADIT AREA FIGURE 2.2



ADIT AND PORTAL INVESTIGATION REPORT - 2013 UPDATE FIELD INVESTIGATION PLAN FIGURE 3.1



- 2013 UPDATE ADIT AND PORTAL INVESTIGATION REPORT GEOLOGIC MAP FIGURE 5.1



Appendix A: Field

Investigations

- Boring Logs, Core Photographs, and Well Completion Diagrams
- 2. Test Pits
- 3. Surface Geophysical Surveys

1. Boring Logs, Core Photographs, and Well Completion Diagrams

AT-02

BAH-01

CHI-101

CHI-102A

CHI-102B

CHI-102C

0111-1020

CHI-103

CHV-101D

CHV-101M

CHV-101S

CHV-101U

DG-1

DG-3

EW-1

EW-2A

MW-201

MW-202

MW-203

MW-204

MW-205

MW-206

MW-207

SSR-103

				CLIEN				LOG OF	BORIN	IG NUI	MREK	F	11-2						
Δ=	Atlantic Richfield Company PROJECT NAME							45011175	ARCHITECT-ENGINEER										
7-		<i>)</i>	•				01104			company: Boart Longyear									
SITE LC		ON		RICO	-Arg	entine Site	- 0001	Drillin	g Co	mpa	any:	NCON	FINED C	OMPRES	SSIVE S	TRENGTH			
3111110	JUATI	OIN									O T	ONS/F	T. ²	3	4	5			
										ŀ		+	-	-	-	-			
(£			핑									STIC IT %		ATER ITENT %		IQUID IMIT %			
DEPTH(FT) ELEVATION(FT)		ᆔ	SAMPLE DISTANCE			DESC	CRIPTION OF MATERIA	AL	١,	-					- — — ·				
DEPTH(FT) ELEVATION	SAMPLE NO.	SAMPLE TYPE		-						UNIT DRY WT. LBS./FT.³	1	10	20	30	40	50			
	APLE	/PLE	SAMPLE DIS	3						70T		_	STANI		'	'			
\boxtimes	SAN	SAN	SAN	SUR	FACE	ELEVATION						⊗ 10	PENE [®]	TRATION 30	I BLOW 40	/S/(FT) 50			
					1	Talus slope w	ash, colluvium, boulder	s up to 8.0'											
	7				3	diameter visib	ole on surface												
	7																		
	_																		
5.0				14/4															
0.0	7				1														
					1														
					1														
				6/8/															
10.0	-																		
	4			82/2															
	=			611	13.0	VOID Drill of	tom advanced with ne d	loure erecoure											
	7					VOID - DIIII SI	tem advanced with no d	lown pressure											
15.0	_																		
					16.0														
						Colluvium													
					1														
	_			<i>XX</i>	19.0														
20.0	Ⅎ					Encountered	tunnel at 19.0' at a 32 d	legree angle borin	g.										
	-					Drill Stem adv	ranced under very little	down pressure.											
	7																		
	-																		
	7																		
25.0					25.0														
23.0	7				20.0	Encountered	railroad rail, tie and ball	ast rock from											
	1				26.5		core barrel - Possible Be	edrock											
						Trip out chang	ge to HQ core.												
	_					Continue as r	ock log below 25.0'.												
							· ·												
30.0	Ⅎ																		
	4																		
	7																		
35.0	_																		
35.0																			
	\perp											L			\perp				
	The	strat	ifica	tion lin	es rer	oresent the ann	proximate boundary line	s between soil tvn	es: in	situ	the tra	ansitio	on may	be are	adual.				
NORTHIN						што арр								9.0					
NOKIHIN	NG	1389	126				BORING STARTED		AECO	M OFF	ICE	De	nver						
EASTING	-	2268	406				BORING COMPLETED		ENTER	RED BY	 3	SI	HEET NO). 1)F 1				
EASTING		0	700				RIG/FOREMAN		APP'D			AF	ECOM JC						
ا							1			•				60157	7757				

CLIENT LOG OF BORING NUMBER AT-2 **Atlantic Richfield Company AECOM** PROJECT NAME ARCHITECT-ENGINEER **Rico-Argentine Site - OU01 Drilling Company: Boart Longyear** SITE LOCATION SURFACE ELEVATION +8,866.2 Feet DRILLING LITHOLOGY DISCONTINUITY **ELEVATION(FT)** DEPTH(FT) CORING TIME, MIN/FT (AVG) ROUGHNESS FRACTURE FREQUENCY (BREAK/FT) RECOVERY ᇤ APERTURE DEG GRAPHIC RUN NO. VISUAL DESCRIPTION AND REMARKS SHAPE INFILL RQD, OIP, Rock core log continued from soil Run No.Run No. boring log at 25.0' 25.0 Encountered railroad rail, tie and 26.5 ballast rock in core barrel Bedrock or rock present from 26.5-35.0', Latite porphyry (intrusive rock) 30.0 Run No. No significant recovery 35.0 End of boring at 35.0' (drilled at 32 degrees horizontal)
Core logged by: L. Beem
T.O. Casing EL. 8866.21 AECOM CORELOG 60157757.GPJ FS_DATATEMPLATE.GDT 12/13/11 The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual. NORTHING BORING STARTED AECOM OFFICE Denver 1389126 EASTING BORING COMPLETED ENTERED BY **KKB** SHEET NO. 2268406 RIG/FOREMAN APP'D BY AECOM JOB NO WL (DEPTH)

60157757



CLIENT LOG OF BORING NUMBER **BAH-01 Atlantic Richfield Company AECOM** PROJECT NAME ARCHITECT-ENGINEER Rico-Argentine Site - OU01 **Drilling Company: Boart Longyear** -O-UNCONFINED COMPRESSIVE STRENGTH TONS/FT.² 1 2 3 4 5 SITE LOCATION PLASTIC WATER LIQUID SAMPLE DISTANCE **ELEVATION(FT)** LIMIT % CONTENT % LIMIT % DEPTH(FT) SAMPLE TYPE **DESCRIPTION OF MATERIAL** UNIT DRY WT. LBS./FT.³ <u>~</u> SAMPLE NO. RECOVERY 10 30 50 STANDARD ⊗ 10 PENETRATION BLOWS/(FT) SURFACE ELEVATION +8,912.6 Feet Cobbles, silt, sand - drilling mud: brown-red brown Angle boring at 13 degrees from horizontal 5.0 10.0 Easy drilling - drill mud brown 15.0 Cobbles, boulders - drill mud brown with multiple rock type fragments 20.0 25.0 Easy drilling - drill mud brown with red ss, gray Is and others. 30.0 Boulder DATATEMPLATE.GDT Cobbles, boulders - easy drill - drill mud brown 35.0 Moderate drill - drill mud brown ES **AECOM LOG 60157757.GPJ** 40.0 ... continued AECOM JOB NO. 60157757 SHEET NO. The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

PRICE TIME Rico-Argentine Site - OU01 Prilling Company: Boart Longyear Continued Prilling Company: Boart Longyear	CLIENT Atlantic Richfield Company	LOG OF BOR	ING NU	IMBER	BAH-01	
DESCRIPTION OF MATERIAL STANDARD STANDA	PROJECT NAME	ARCHITECT-	ENGINE	EER		
DESCRIPTION OF MATERIAL DESCRIPTION OF MATERIAL DESCRIPTION OF MATERIAL DESCRIPTION OF MATERIAL 10 20 30 40 50 STANDARD		Drilling C	omp	any: Bo	art Longy	/ear
DESCRIPTION OF MATERIAL DESCRIPTION OF MATERIAL DESCRIPTION OF MATERIAL DESCRIPTION OF MATERIAL 10 20 30 40 50 STANDARD	ELOCATION			-O-UNCON TONS/F	NFINED COMPR FT. ²	ESSIVE STRENGT
\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	DESCRIPTION OF MATERIAL		VT.	PLASTIC LIMIT %	WATER CONTENT	LIQUID % LIMIT %
45.0 45.0 45.0 45.0 Boulder - drill mud brown - multiple rock fragment types 55.0 Cobbles, boulders - easy drill 55.0 Cobbles, boulders - easy drill 55.0 Boulder - drill mud brown - multiple rock fragment types 60.0 Boulder - drill mud brown - multiple rock fragment types 60.0 Boulder - drill mud brown - multiple rock fragment types Cobbles, boulders - easy drill	MPLE NC MPLE TY COVERY		IIT DRY V	<u> </u>	STANDARD	+ +
45.0 45.0 45.0 50.0 Boulder - drill mud brown-red brown - multiple rock fragment types 53.0 55.0 55.0 56.0 Boulder - drill mud brown - multiple rock fragment types 55.0 60.0 Boulder - drill mud brown - multiple rock fragment types 60.0 Cobbles, boulders - easy drill 60.0 Boulder - drill mud brown - multiple rock fragment types 60.0 Easy drill - some cobbles 60.0 60.0 Cobbles, boulders Lost circulation at 65.0 Easy drill - some cobbles 60.0 Cobbles, boulders	Devides and sets dell dell seconds	(Continued)	8 g			
### Special Science						
Cobbles, boulders Lost circulation at 65.0' Easy drill - some cobbles 75.0 75.0 80.0 continued	Boulder - drill mud brown-red brown - mult fragment types 53.0 Cobbles, boulders - easy drill 55.0 Cobbles, boulders - easy drill Cobbles, boulders - easy drill					
Lost circulation at 65.0' Easy drill - some cobbles 70.0 75.0 80.0 Lost circulation at 65.0' Easy drill - some cobbles continued	Cobbles, boulders					
	Lost circulation at 65.0' Easy drill - some cobbles OC OC OC OC OC OC OC OC OC O	ued				
The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual. AECOM JOB NO. SHEET NO. 2 SHEET NO. 2						

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AE	C) <i>V</i>	•	Atla	antic Richfield Company JECT NAME ARCHITECT	FENOIN						
	•	<i>,</i> ,,,	•		co-Argentine Site - OU01 Drilling			Roar	+ I 🗛	าตพอล	r	
SITE LO	CATI	ON		IVIC	Drining	Comp		NCONFI	NED CO	MPRESS	IVE STRI	ENGTH
							Т	ONS/FT. ²	? <u>2</u>	3 4	. 5	<u> </u>
							PLAS	STIC	١٨/٨	TER	LIQI	IID
(FT)N			ANCE				LIMI	T %	CONT	ENT %	LIMI	T %
DEPTH(FT) ELEVATION(FT)	ō.	I Y E	JIST,	-	DESCRIPTION OF MATERIAL	¥	1	←		30 4	-	
DEPTH(FT) ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	i 		DRY	<u> </u>		STAND		-	
	SAM	SAM	SAM	SU	JRFACE ELEVATION +8,912.6 Feet (Continued	UNIT DRY WT.	1	3	PENETI	RATION I	BLOWS/(50 50	
			T	60	Cobbles, boulders							
				100	0							
	1			00								
				1,0) (
85.0]			9	85.0 Hard boulder - drill mud brown-red brown - multiple rock							
					type fragments							
					√ √88.0							
					Cobbles boulders - moderate drilling							
90.0												
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33.0	•			60	d							
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100.0			4	₩ ○	Circulation 100.0-104.0' - drill mud brown-red brown							
				60	\°]							
				60								
			П	٦°٥,								
105.0					Relatively easy drilling							
				60	\^{\bigs_{\text{\tint{\text{\text{\text{\text{\text{\text{\text{\tint{\text{\tint{\text{\text{\text{\text{\text{\text{\text{\text{\tint{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\tint{\text{\text{\text{\tint{\text{\tint{\text{\text{\text{\text{\text{\text{\text{\tint{\text{\text{\text{\text{\text{\text{\text{\tint{\text{\tint{\text{\tint{\text{\text{\tint{\text{\text{\tin}\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\tinit}\\ \text{\text{\text{\text{\text{\text{\tinit}\\ \tittt{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\tinit}\\ \tint{\text{\text{\text{\text{\tinit}\tex{\tinit}\\ \text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\tin}\}\\ \ti}\tint{\text{\text{\text{\tinit}}\\ \tint{\text{\text{\text{\text{\tinit}\tint{\text{\tinit}\tint{\text{\ti}\tint{\text{\text{\tex{\tinit}\tittt{\texi}\tint{\text{\ti}\tint{\text{\tinit}\ti							
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The strat	tificatio	on line:	s rep	resent t	the approximate boundary lines between soil types: in situ, the transition may be gradua	I. ALC	OM JOB I	01577	57	- ILL INC	. 3	4

				1	CLIENT		LOG OF BO	ORING NU	JMBER	В	AH-0	1		
A=	CC	D٨	1		Atlantic Richfield Co	mpany	ARCHITEC	T ENGINE	ED					
	•		•	1	Rico-Argentine Site -	· OU01	Drilling			Boa	rt Loi	navea	r	
SITE LOC	CATI	ON							T	NCONF ONS/FT	INED CO	MPRESSI	VE STR	ENGT
									'1	1	2	3 4		5
DEPTH(FT) ELEVATION(FT)		ш	SAMPLE DISTANCE		DESCI	RIPTION OF MATERIAL		٠	PLAS LIMI		CONT	TER TENT %		UID IT %
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DEPTH(FT) ELEVATION	SAMPLE NO.	SAMPLE TYPE	MPLE	RECOVERY				UNIT DRY WT.	(8	λ	STAND	ARD RATION E		·
	SA	S,	Ϋ́	R	SURFACE ELEVATION +		(Continue	d) 3 🖺	1			30 40		(F1) 50
			Ш		Cobbles, bould	ers - moderate drilling								
			Ш		600									
			Ш		124.0									
25.0			П		Boulder - circul	ation restored - drill mud brown	n-red brown							
					- multiple rock t	types in mud								
					127.0	and a second of the second								
			Н	\dashv	Copples, bould	ers - easy drilling								
20.0			Ш		00									
30.0			Ш											
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			Ш		60 0 (137.0							+		
			Н											
0.0						ation returns drill mud brown-re	ed brown -							
					multiple rock ty	pes in mud								
=														
45.0					200									
45.0					Drill mud chang	ged to gray-green - mineralogy	appears							
					consistent with	latite, no other rock fragments	present.							
					Drill mast and f	ront of rig lift off the ground, dri	iller backed							
					Driller notes po	ure, rig sets back to original loc ssible bedrock at 147.0'. Drill r	mud							
50.0					appears to contable about 6.0" into	tain latite fragments, no others.	. Drilled							
						ring 10/31/2011 (broken roller b	oit)							
						with core bit and redrill to 147.0								
55.0					-	gged by L. Beem.								
					Continued as re	ock core log below 147.0'.								
					Committee do la	2 20.0 .09 001011 171.01								
100.0														
160.0	The	strat	tific	ati	on lines represent the appro	oximate boundary lines betwee	en soil tynes	s: in situ	the tra	nsitio	n mav	be grad	ual.	
RTHING						BORING STARTED		ECOM OF			nver			
ASTING		1388				10/26/11 BORING COMPLETED 11/9/11	E	NTERED B	Y.		EET NO.	OF		
'L		2268	36	5		11/9/11 RIG/FOREMAN		SJ PP'D BY	Н		COM JOE	4	4	
-						/		EE	D	ΛΕ	JOIN JUE	601577	57	

CLIENT LOG OF BORING NUMBER **BAH-01 Atlantic Richfield Company** A=COM PROJECT NAME ARCHITECT-ENGINEER **Rico-Argentine Site - OU01 Drilling Company: Boart Longyear** SITE LOCATION SURFACE ELEVATION +8,912.6 Feet DRILLING LITHOLOGY DISCONTINUITY **ELEVATION(FT)** DEPTH(FT) CORING TIME, MIN/FT (AVG) ROUGHNESS RECOVERY ᇤ APERTURE DEG GRAPHIC RUN NO. VISUAL DESCRIPTION AND REMARKS DEPTH, SHAPE INFILL RQD, OIP, Rock core log continued from soil 145.0 Run No. boring log at 147.0' 147 Cored to 153.0' - recovered few rock fragments of colluvial material. Switch back to HWT casing. No 150.0 drill fluid return. 153 Fragments of sandstone, shale and Run latite porphyry (Colluvium) 155.0 156.0' - Fluid returns - medium green gray 160 160.0 Fragments of greenstone, quartz Run No vein, sandstone (Colluvium) - hard 37 20 - largest clast 0.8' - switch to HQ3 to sample/drill through block - angle of 163 rods 15 degrees - core barrel stuck tripped drill string 165.0 Variable hard and soft drilling advanced HWT casing with shoe bit - medium brown drill fluid returns 170.0 Run No. 174.0' - Add 10.0' feet of casing -175.0 reem/no sample GPJ FS DATATEMPLATE.GDT 177.0' - Quartzite, light gray, unfractured, hard, strong - possible 178 177.17' - Drilling hard - return fluids change color to dark gray - switch to 180.0 Run No. coring 62 32 Fines (matrix) wash out during drilling - cored 178.0-183.0' - hard 183 and soft zones - returns varied light AECOM CORELOG 60157757. gray (hard drilling) to dark dirty ... continued AECOM JOB NO. 60157757 SHEET NO. The stratification lines represent the approximate boundary lines between soil/rock types: in situ, the transition may be gradual.

CLIENT LOG OF BORING NUMBER **BAH-01 Atlantic Richfield Company** A=COM PROJECT NAME ARCHITECT-ENGINEER **Rico-Argentine Site - OU01 Drilling Company: Boart Longyear** SITE LOCATION SURFACE ELEVATION +8,912.6 Feet DRILLING LITHOLOGY DISCONTINUITY **ELEVATION(FT)** DEPTH(FT) CORING TIME, MIN/FT (AVG) ROUGHNESS RECOVERY APERTURE F DEG GRAPHIC VISUAL DESCRIPTION AND REMARKS RUN NO. DEPTH, SHAPE INFIL RQD, ЫP, un No. brown (soft drilling) 185.0 'Soft" smooth drilling no 186 cuttings/fluid return - trip HQ rods advance HWT casing through Run No. colluvium, no returns 185.42' - Drilling becomes hard, 98 60 switch to HQ3 core 190.5 Sandstone, light green gray, massive, hard, moderately strong, 190.0 ġ fine grained 80 Run l 40 189.17' - Dark gray siltstone, closely fractured, moderately hard, weak, grades to s.s. Medium dark gray limestone closely 195.0 fractured Run No Drill/core to 193.0' and pull drill 41 12 string
Sandstone and siltstone with medium brown sandy clay matrix variable hard to soft drilling - most 200 200.0 fines (matrix) washing out 193.42' - Drilling becomes variably hard, soft zones encountered Run No. 198-58' - Latite porphyry - light 78 20 green gray, medium grained with pyrite stringers to veinlets 205 No circulation 205.0 Wash out from 200.0-202.33' 202.33' - Latite porphyry, medium bluish gray (5B 5/1), hard, Run No moderately strong with feldspars to 76 0 0.25" 204.5' - Shale, medium to dark gray (N3.5), hard, weak, closely 210.0 fractured. Colluvium consists of mixture of g sandstone, shale, arkose with red 82 20 Run Fine grained matrix wash out - clast range from 0.4'-0.5" 215.0 Altered sandstone - medium greenish gray, fine grained, with apparent relic beds or cross bed at DATATEMPLATE. 2 25 degrees to axis of core -67 0 moderately fractured, moderately Run hard, weak with pyrite and quartz along fracture surfaces (up to 0.25") 220.0 220.5214.5' - Small fault zone Possible bedrock at 215.0' ES Closely fractured Run No. GPJ 77 0 AECOM CORELOG 60157757. ... continued AECOM JOB NO. 60157757 SHEET NO. The stratification lines represent the approximate boundary lines between soil/rock types: in situ, the transition may be gradual.

CLIENT LOG OF BORING NUMBER **BAH-01 Atlantic Richfield Company** A=COM PROJECT NAME ARCHITECT-ENGINEER **Rico-Argentine Site - OU01 Drilling Company: Boart Longyear** SITE LOCATION SURFACE ELEVATION +8,912.6 Feet DRILLING LITHOLOGY DISCONTINUITY **ELEVATION(FT)** DEPTH(FT) CORING TIME, MIN/FT (AVG) ROUGHNESS FRACTURE FREQUENCY (BREAK/FT) RECOVERY APERTURE ᇤ DEG GRAPHIC VISUAL DESCRIPTION AND REMARKS RUN NO. DEPTH, SHAPE INFIL TYPE RQD, P, 224.25 Shear zone - siltstone dark green **** 225.0 gray, closely fractured with light 230 gray gouge along fractures.
Loss circulation, core blocked, stop Run No. 100 38 trip at 220.5' - switch back to 5.0' core barrel for recovery Good circulation through 5.0' run -NQ rods at 15.5 to horizontal 230.0 ∵*\/*/281 degrees at surface Run No Siltstone, medium dark gray (N3.5), 0 34 hydrothermally alt., finely dissim. pyrite, closely fractured with quartz veins and veinlets 0.063-.125", moderately hard, weak to 235.0 235.2 moderate; y strong. Quartz vein, white to light gray Run No (N9-N7), with vugs 0 96 Lost circulation Shear zone with fault gouge, intensely fractured 240 240.0 Sandstone/siltstone, medium dark gray (N4/5), sandstone very fine Run No grained grades at 238.0' to 20 0 siltstone, closely fractured, moderately hard, weak with pockets of pyrite and quartz to 0.25' 240.0-252.0' - VOID - pushed rods 245.0 with no resistance except for apparent slough zone when lowered Run No rods to 244.0' to advance another 5.0'. Pushed back through void from 246.0-252.0'. Assume one continuous void (St. Louis Tunnel) 250.0 Run No. 252 Drill stem appeared to be following tunnel; at risk of losing core barrel terminated drilling hole after 12.0' of 255.0 void. Run No. 60157757.GPJ FS DATATEMPLATE. 260.0 The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual. AECOM CORELOG BORING STARTED 10/26/11 NORTHING **AECOM OFFICE** Denver 1388951 BORING COMPLETED 11/9/11 EASTING ENTERED BY SJH SHEET NO. 2268365 RIG/FOREMAN APP'D BY AECOM JOB NO WL (DEPTH)

60157757

CLIENT LOG OF BORING NUMBER CHI1-102(B) **Atlantic Richfield Company DRAFT AECOM** PROJECT NAME ARCHITECT-ENGINEER **Rico - Argentine Mine Site** Anderson Engineering Company, Inc. -O- UNCONFINED COMPRESSIVE STRENGTH TONS/FT.² 1 2 3 4 5 SITE LOCATION **Rico-Argentine** PLASTIC WATER LIQUID SAMPLE DISTANCE ELEVATION(FT) LIMIT % CONTENT % LIMIT % DEPTH(FT) SAMPLE TYPE **DESCRIPTION OF MATERIAL** - -UNIT DRY WT. LBS./FT.³ SAMPLE NO. RECOVERY 10 30 STANDARD ⊗ 10 PENETRATION BLOWS/(FT) 20 30 40 50 SURFACE ELEVATION Mixture of soil and rock fragments are predominantly 1/2 red brown fine grained sandstone, 1/2 bluish green altered quartzite with finely diss py; rock set in red brown HW sandy silt soil °0 (9 01 5.0 0 HW 000 000 HW 10.0 0 HW 15.0 0 HW 20.0 AECOM LOG 60239818 RICO-UPDATED 4-8-13.GPJ FS_DATATEMPLATE.GDT ,000 HW 25.0 HW 30.0 ... continued AECOM JOB NO. 60239818 SHEET NO. The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

CLIENT LOG OF BORING NUMBER CHI1-102(B) **Atlantic Richfield Company DRAFT AECOM** PROJECT NAME ARCHITECT-ENGINEER **Rico - Argentine Mine Site** Anderson Engineering Company, Inc. - UNCONFINED COMPRESSIVE STRENGTH SITE LOCATION TONS/FT.² **Rico-Argentine** 3 PLASTIC WATER LIQUID SAMPLE DISTANCE **ELEVATION(FT)** LIMIT % CONTENT % LIMIT % DEPTH(FT) SAMPLE TYPE **DESCRIPTION OF MATERIAL** - -UNIT DRY WT. LBS./FT.³ SAMPLE NO. RECOVERY 10 30 STANDARD ⊗ 10 PENETRATION BLOWS/(FT) SURFACE ELEVATION (Continued) Mixture of soil and rock fragments are predominantly 1/2 red brown fine grained sandstone, 1/2 bluish green altered quartzite with finely diss py; rock set in red brown sandy silt soil Po, C. Hard zone noted at 33.0 ft HW 35.0 0 HW 40.0 HW 45.0 $\circ \bigcirc \circ$ Boulder HW 50.0 AECOM LOG 60239818 RICO-UPDATED 4-8-13.GPJ FS DATATEMPLATE.GDT Mixture of soil and rock fragments are predominantly 1/2 red brown fine grained sandstone, 1/2 bluish green altered quartzite with finely diss py; rock set in red brown sandy silt soil HW 55.0 HW 60.0 ... continued AECOM JOB NO. **60239818** SHEET NO. The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

CLIENT LOG OF BORING NUMBER CHI1-102(B) **Atlantic Richfield Company DRAFT AECOM** PROJECT NAME ARCHITECT-ENGINEER **Rico - Argentine Mine Site** Anderson Engineering Company, Inc. -O-UNCONFINED COMPRESSIVE STRENGTH SITE LOCATION TONS/FT.² **Rico-Argentine** 3 PLASTIC WATER LIQUID SAMPLE DISTANCE **ELEVATION(FT** LIMIT % CONTENT % LIMIT % DEPTH(FT) **-** -△ SAMPLE TYPE **DESCRIPTION OF MATERIAL** UNIT DRY WT. LBS./FT.³ SAMPLE NO. RECOVERY 10 30 50 20 STANDARD ⊗ 10 PENETRATION BLOWS/(FT) SURFACE ELEVATION (Continued) Mixture of soil and rock fragments are predominantly 1/2 red brown fine grained sandstone, 1/2 bluish green altered quartzite with finely diss py; rock set in red brown sandy silt soil 000 HW 65.0 End of boring at 65 ft. Casing apparently separated at 62 ft. Pulled the hammer and rods out and left 5" I.D. 60239818 RICO-UPDATED 4-8-13.GPJ FS_DATATEMPLATE.GDT 4/29/13 The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual. NORTHING BORING STARTED AECOM OFFICE Denver AECOM LOG BORING COMPLETED 10/17/12 ENTERED BY AMH EASTING SHEET NO. AECOM JOB NO. 60239818

Modified Ditchwitch/Kyle King

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None Observed

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A=C	.(JN	1	F	ROJECT NAME	ARCHITECT-					
				l	Rico - Argentine Mine Site	Andersor	n Eng	ineering	յ Com	ոpany, I	nc.
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KICO.		gei	ILLI	П				1		3 4	4 5
ELEVATION(FT)			삥					PLASTIC		WATER	LIQUID
		۳	TAN		DESCRIPTION OF MATERIAL			LIMIT %		ONTENT % —	LIMIT % — — <u>→</u> △
	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	ERY	2200		UNIT DRY WT. LBS./FT.³	10	20	30 4	10 50
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	SA	SA	SA	Ŗ	SURFACE ELEVATION Feet		N N	10	20 20		BLOWS/(FT) 10 50
+					Colluvium - 0% boulder, 5% cobble, 55% graves 10% coarse sand, 10% medium sand, 10% fi	vel, ne					
					sand, 10% fines, 0% organics - 5YR 4/3						
				П	T						
	1	SON		_							
					Cobbles from 4.0 to 5.0 feet						
+											
L					8.0	_			_		
					Colluvium - 0% boulder, 2% cobble, 50% graves 11% coarse sand, 11% medium sand, 11% fi	vei, ne					
					/////sand, 15% fines, 0% organics - 10 YR 4/3						
					Perched water at 9.0 feet						
					Water Test at 11.0 feet						
					Water rest at 11.0 reet						
2	2A	SON									
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\downarrow											
L			Щ	\downarrow	20.0				\perp	\perp	
					Colluvium - 0% boulder, 2% cobble, 50% graves 14% coarse sand, 13% medium sand, 13% fi	ne					
-					sand, 8% fines, 7% organics - 5 YR 4/4						
1					Water Test at 20.0 feet Color becomes 10 YR 4/4						
				П	Cobbles form 23.0 to 29.0 feet						
					1						
1											
1	2B	SON			: ♥1√						
┤¯											
-					Perched water at 29.0 feet						
7-		† – -	 	- 4	contini	 _ _ ued		1+-			tt-
					σσιμικ	-					
he stratific	catio	on line	s rep	pres	sent the approximate boundary lines between soil types: in situ, the trans	ition may be gradual.	AEC	OM JOB NO. 602	39818	SHE	ET NO

			_	1	LIENT Atlantic Richfield Company	LOG OF BOR	ING NU	IMRFK (CHV-101D	
AΞ		JΝ	1	F	ROJECT NAME	ARCHITECT-	ENGINE	ER		
					Rico - Argentine Mine Site	Andersor	n Eng	ineering	Company, Inc.	
SITE LOC						1		UNCON	FINED COMPRESSIVE S T. ² 2 3 4	STRE
Rico	o-A	rgei	nti	ne			1	1	2 3 4	5
N(FT)			ANCE					PLASTIC LIMIT %	CONTENT %	LIQU LIMIT
ELEVATION(FT)	E NO.	SAMPLE TYPE	SAMPLE DISTANCE	/ERY	DESCRIPTION OF MATERIAL		UNIT DRY WT. LBS./FT.³	10	20 30 40	- - △ 50
1 =	SAMPLE NO.	SAMPL	SAMPL	RECOVERY	SURFACE ELEVATION Feet	(Continued)	UNIT DRY LBS./FT. ³	⊗ 10	STANDARD PENETRATION BLOV 20 30 40	WS/(F 50
			1	Ī	Colluvium - 0% boulder, 2% cobble, 50% gravel 14% coarse sand, 13% medium sand, 13% fine sand, 8% fines, 7% organics - 5 YR 4/4	,			30 40	30
35.0					Colluvium - 0% boulder, 5% cobble, 50% gravel 14% coarse sand, 13% medium sand, 13% fine sand, 8% fines, 0% organics - 10YR 4/4 Perched water at 35.0 feet), }				
	3	SON	•		Color becomes 7.5 YR 2.5/5 Fines drop to 5% Significant black carbon content	Ш				
40.0					Water Test at 40.0 feet					
45.0	4	SON			Alluvial/Colluvium - 0% boulder, 2% cobble, 50% gravel, 12% coarse sand, 12% medium sand, 1 fine sand, 12% fines, 0% organics - 10YR 4/4 Water at 44.0 feet (saturated zone)	2%				
55.0	5	SON			Alluvial/Colluvium - 0% boulder, 2% cobble, 50% gravel, 14% coarse sand, 13% medium sand, 1 fine sand, 8% fines, 0% organics - 5 YR 4/4 Water Test at 50.0 feet					
60.0					60.0					
					continue	d				
					ent the approximate boundary lines between soil types: in situ, the transiti		AFC	OM JOB NO. 6023 9	SHEET NO.	

				1	CLIENT	LOG OF BORI	NG NU	MBER	CHV-1)1D		
		~	•	١,	Atlantic Richfield Company							
AΞ		JN	1	F	PROJECT NAME	ARCHITECT-E	NGINE	ER				
					Rico - Argentine Mine Site	Anderson	Eng	ineering	Comp	any, Ir	ıc.	
SITE LO	CAT	ON		_				∪ UNCO	NFINED CO	MPRESSI	VE STRI	ENGTH
Ric	o-A	rge	nti	ne	9			TONS/	FT. ² 2	3 4	5	j
DEPTH(FT) ELEVATION(FT)		Щ Д	TANCE		DESCRIPTION OF MATERIAL		ī.	PLASTIC LIMIT %	CON	TER ENT %	LIQI LIMI 	T %
DEPTH(FT) ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY			UNIT DRY WT. LBS./FT.³	10	STAND		+	
\bowtie	SAI	SAI	SAI	R	SURFACE ELEVATION Feet	(Continued)	I S S	⊗ 10		RATION B 30 40		
					Water Test 60.0 feet							
65.0	6	SON			Alluvium - 0% boulder, 0% cobble, 20% gravel, 20 coarse sand, 30% medium sand, 25% fine sand, 5 fines, 0% organics - 5 YR 4/3	5%						
70.0	7	SON			Alluvium - 0% boulder, 0% cobble, 5% gravel, 40% coarse sand, 30% medium sand, 20% fine sand, 5 fines, 0% organics - 2.5 YR 4/3 Water Test at 70.0 feet	6 5%						
80.0	8	SON			Alluvium - 0% boulder, 5% cobble, 0% gravel, 20% coarse sand, 30% medium sand, 40% fine sand, 5 fines, 0% organics - 5 YR 3/3 Water Test 80.0 feet	65%						
85.0					85.0 Alluvium - 0% boulder, 0% cobble, 60% gravel, 10	19/0						
90.0	9	SON			coarse sand, 10% medium sand, 15% fine sand, 8 fines, 0% organics - 2.5 YR 4/1 4.0-inch+ cobble, dark gray sand stone	5%						
30.0					continued							
The strat	tificati	on line	s re	pre	esent the approximate boundary lines between soil types: in situ, the transition	may be gradual.	AEC	OM JOB NO. 6023	9818	HEET NO	. 3)F 5

				1	LIENT		LOG OF BOF	RING NU	IMBER	CH\	/-101D		
A =		7 4	A			ntic Richfield Company							
AΞ	u	JIV	4	1		CT NAME	ARCHITECT-						
				F	Rico	- Argentine Mine Site	Anderso	n Eng	ineerii	ng Co	mpany,	Inc.	
SITE LO							1		-O-UN	CONFINE	D COMPRES	SIVE STR	ENGT
Rico	o-A	rge	ntir	ne)				1	NS/FT. ²	3	4	5
									·		'	'	
DEPTH(FT) ELEVATION(FT)			팋						PLAS LIMIT		WATER CONTENT %		UID IT %
E N		씸	IA			DESCRIPTION OF MATERIAL		Ŀ			_		
DEPTH(FT) ELEVATION	NO.			교				> ∞	10	20	30	40 5	50
	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY				UNIT DRY WT. LBS./FT.³			ANDARD	•	•
$\overline{\mathbf{X}}$	SAN	SAN	SAN	낊	SURF	FACE ELEVATION Feet	(Continued)	LBS	⊗ 10		NETRATION 30		(FT) 50
			Ħ		\ /	Water Test 90.0 feet	,		l ï			1	
					\ /								
					\ /								
					\setminus / \mid	0 1 0 7 1/2 1/2							
					\vee	Color: 2.5 YR 4/2 3.0-inch red sandstone cobble							
					\	3.0-mon red sandstone cobble							
95.0					/\								
JJ.U					/\								
					/ \								
	L	L		/	/ \	97.0						<u></u>	L
						Colluvium/Alluvium - 0% boulder, 10% cobble, 4	0%						
	40	001	Ш			gravel, 12% coarse sand, 13% medium sand, 1 fine sand, 10% fines, 0% organics - 1 GLEY 4/1	0%						
	10	SON	111	Ц		inte sand, 1070 intes, 070 signification 1 deel 471							
00.0			ШĒ			100.0							
00.0			Ш	П	11	Severly weathered boulders/cobbles - ?% bould	er,						
						10% cobble, 70% gravel, 10% coarse sand, 5%	nico						
				H		medium sand, 5% fine sand, 2% fines, 0% orga 1 GLEY 4/1	nics -						
						Water Test at 100.0 feet							
					a . a								
				[a a								
5.0					a a	Boulders pulverized by drilling process							
				H	4 4	104.0-106.0 feet - limestone							
						106.0-113.0 feet - dark gray sandstone/limestor	ne						
						113.0-115.0 feet - dark gray sandstone 115.0-119.0 feet - dark gray sandstone							
					a a	119.0-120.0 feet - dary gray sandstone							
					a . a	120.0- 121.0 feet - dark gray mud stone							
				$ \cdot $	4 . 4								
0.0					•	Water Test at 109.5 feet							
						1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1							
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20.0					aa			L				1	L
		T	ΤˈŤ	7	= 1	continued	<u> </u>	T	1+			Ţ	Γ
								1 100		<u> </u>	SHEET N	IO '	DF
he strati	ficatio	n line	s rep	ores	sent the	approximate boundary lines between soil types: in situ, the transition	n may be gradua	· AEC	OM JOB N 60	ž [.] 39818	SHEELN	4	JF

				CLIENT			LOG OF E	BORII	NG NUI	MBER	CHV	-101D		
A	C) N	1	Atlantic Ric		mpany	ARCHITE	OT F	NOINE					
			•	Rico - Arge		Site				⊨ĸ ineering	Con	nnanv	Inc	
SITE LC	CATI	ON		Trioc Aigo	THE THINK	, 0110	Allacit	JOI.		□ UNCO □	NEINED	COMPRES	SSIVE S	TRENGTH
Ric	o-A	rger	ntin	е						TONS/	FT. ²	3	4	5
T) ON(FT)		Е	ANCE		DESCI	RIPTION OF MATERIAL				PLASTIC LIMIT %		WATER ONTENT %	LI	IQUID IMIT %
DEPTH(FT) ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE		DLOO	MI HON OF WATERIAL			UNIT DRY WT. LBS./FT.³	10	20	30	40	50
	SAMP	SAMP	SAMP	SURFACE ELE	EVATION F	eet	(Continu	ied)	UNIT LBS./F	⊗ 10		INDARD NETRATION 30	BLOW 40	S/(FT) 50
135.0 130.0 130.0 130.0 130.0 130.0		SON		Ve mi be fra	everly weather 20% cobble, 70% cobble, 70% edium sand, 5 GLEY 4/1 after Test at 12 esidual low plandstone cobblone, scattered page with unoxilis returned for wet core method wet core method stones, signedding planes, agement orient agement orient commented fautsone chunks 5/N silt (ML) not sobble planes, agement orient commented fautsone chunks 5/N silt (ML) not sobble planes, agement orient commented fautsone chunks 5/N silt (ML) not sobble planes, agement orient commented fautsone chunks 5/N silt (ML) not sobble planes, agement orient commented fautsone chunks 5/N silt (ML) not silt sobble planes, agement orient commented fautsone chunks 5/N silt (ML) not silt silt silt silt silt silt silt sil	red boulders/cobbles - ?% bould gravel, 10% coarse sand, 5% fine sand, 2% fines, 0% org. 20.0 feet asticity silt from weathered boul careous and non-calcareous hales and gravels, weathered multiple chuncks of hard recemented fided pyrite mineralization, no rem 132.0 to 135.0 feet, could be compared by laminated significant sandstonificant pyrite mineralization aloued bedding planes on intact core ted near horizontal.	der, 66 anics - der ard der ault ault asidual pe due on-calc LEY							
9818		The s	tratif	ication lines rep	resent the app	proximate boundary lines betwe	en soil types	s: in	situ, th	e transitio	n may	be gradua	al.	
				<u> </u>		BORING STARTED			OM OFF	ICE	enver			
EASTING WL						BORING COMPLETED		ENTE	ERED BY	(H	SHEETI	NO. C)F 5	
AECON						RIG/FOREMAN Boart/Longyear Sonic 300/R	ick Mallet	APP'			AECOM	JOB NO. 6023 9		































A≡ COM	CLIENT Atlantic Richfield Company	LOG OF BORING NUMBER CHV-101M DRAFT
AECOM	PROJECT NAME	ARCHITECT-ENGINEER
	Rico - Argentine Mine Site	Anderson Engineering Company, Inc.
SITE LOCATION Rico-Argenti	ne	UNCONFINED COMPRESSIVE STRENGT TONS/FT.2 3 4 5
DEPTH(FT) ELEVATION(FT) SAMPLE NO. SAMPLE TYPE SAMPLE DISTANCE	DESCRIPTION OF MATERIAL	PLASTIC WATER LIQUID LIMIT % CONTENT % LIMIT %
SAMP SAMP	SURFACE ELEVATION Feet	☐ L STANDARD
5.0 10.0 15.0 20.0 25.0 The stratification lines re	co	ntinued State of the state of t
The stratification lines re	present the approximate boundary lines between soil types: in situ, the	transition may be gradual. AECOM JOB NO. 60239818 SHEET NO. 0F

				CLIENT Atlantic	Richfie	ld Con	npany	,		LOG OF		NG NU	MBER	C	HV-1	01M		
AΞ	C	JN	1	PROJECT N	NAME					ARCHIT				٠ <u>.</u> (`omr	\0n\/	Ina	
SITE LO	CATI	ON		RICO - A	Argentin	e wiine	Site			Ande	rson	⊏ng	ineerir	CONFI	NED CO	ompres	SIVE	STRENGTI 5
Ric			ntin	ie									O TON	NS/FT.	2 2	3	4	5
DEPTH(FT) ELEVATION(FT)			SAMPLE DISTANCE			DE005		. 05	EDIA!				PLAS ⁻ LIMIT			ATER TENT %		LIQUID LIMIT %
DEPTH(FT) ELEVATION	Š.	TYPE	DIST	4		DESCF	RIPTION	I OF MAT	ERIAL			Y WT	10		20	30	40	50
	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIS									UNIT DRY WT. LBS./FT.³	8		STANE		DI O	MC//ET)
\times	S,	SA	SA	SURFAC	E ELEVATION	ON Fe	eet			(Contin	nued)	S ë	10	:	20	RATION 30	40 1	50
38.3																		
	<u> </u>		<u> </u>	fination !!		4.41= -		. h.a !	ا ا معالی			_ta - c					<u> </u>	
		The	strati	fication line	s represent	t the app			y lines betw	een soil type	_			ion n	nay be	gradua	al.	
NORTHING	G							STARTED				OM OFF		Den				
ASTING							BORING	COMPLETE	ED		ENT	ERED B'	Υ H	SHE	EET NO	2 0	F 2	<u> </u>
٧L							RIG/FOR	EMAN	,		APP'	D BY		AEC	COM JO	B NO. 60239	818	

CLIENT LOG OF BORING NUMBER CHV-101S (MW) **Atlantic Richfield Company DRAFT AECOM** PROJECT NAME ARCHITECT-ENGINEER **Rico - Argentine Mine Site** Anderson Engineering Company, Inc. -O-UNCONFINED COMPRESSIVE STRENGTH SITE LOCATION TONS/FT.² **Rico-Argentine** PLASTIC WATER LIQUID SAMPLE DISTANCE **ELEVATION(FT** LIMIT % CONTENT % LIMIT % DEPTH(FT) $-\!\!\triangle$ SAMPLE TYPE **DESCRIPTION OF MATERIAL** UNIT DRY WT. LBS./FT.³ SAMPLE NO. RECOVERY 10 30 50 STANDARD ⊗ 10 PENETRATION BLOWS/(FT) SURFACE ELEVATION +8,858.9 Feet FILL: Clayey sand, some fine to coarse gravel -24% gravel, 46% fine to coarse sand, 30% fines -1 AS dark reddish brown 5YR3/2 - loose (FILL: SC) 2 SS HSA 5.0 3 SS HSA Silty sand with fine to coarse gravel - 14% fines -4 SS brown 7.5YR4/2 - medium dense - moist (SM-GM) HSA 10.0 5 SS HSA Clayey sand with gravel - 40% fine gravel, 43% fine to coarse sand, 17% fines - reddish brown 5YR4/3, with color change to olive gray 5Y3/2 @ 6 SS 17.5 ft - medium dense - saturated at 12.8' in perched ground water table (SC) HSA 15.0 7 SS HSA 8 SS HSA 20.0 Lean clay, low plasticity, some fine to coarse **,**O gravel, some fine to coarse sand - brown 10YR4/3 9 SS - very stiff (CL) HSA Clayey gravel, some fine to coarse sand - brown 10 SS 10YR4/3 - medium dense - wet (GC) 50/1" HSA 25.0 HSA Silty gravel, some fine to coarse sand - 14% fines 12 SS olive gray 5Y4/2 - dense - wet (GM) HSA 29.7 30.0 * Calibrated Penetrometer ... continued AECOM JOB NO. 60239818 SHEET NO. The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

DATATEMPLATE.GDT

FS

60239818 RICO-UPDATED 4-8-13.GPJ

AECOM LOG

CLIENT LOG OF BORING NUMBER **CHV-101S (MW) Atlantic Richfield Company DRAFT** A=COM PROJECT NAME ARCHITECT-ENGINEER **Rico - Argentine Mine Site** Anderson Engineering Company, Inc. -O-UNCONFINED COMPRESSIVE STRENGTH SITE LOCATION TONS/FT.² **Rico-Argentine** 3 PLASTIC WATER LIQUID SAMPLE DISTANCE **ELEVATION(FT** LIMIT % CONTENT % LIMIT % DEPTH(FT) - -SAMPLE TYPE **DESCRIPTION OF MATERIAL** DRY WT SAMPLE NO RECOVERY 10 30 STANDARD UNIT LBS./I ⊗ 10 PENETRATION BLOWS/(FT) SURFACE ELEVATION +8,858.9 Feet (Continued) Clayey gravel, some fine to coarse sand - brown 10YR5/3 - dense - wet (GC) 13 SS **Boulders and Cobbles** 35.0 Cobbles, gravel, and sand Gravel 38.0 HSA Cobbles 40.0 Gravel and cobbles Cobbles Gravel and Cobbles Well graded silty gravel and fine to coarse sand, trace clay, with seams of clayey gravelly sand -45.0 15% fines - brown 10YR4/3 - very dense - wet 14 SS (GM) - with seams of clayey sand (SC) HSA 48.0 Drilled with 4-1/4" ID HSA to 29 feet. Auger * Calibrated Penetrometer refusal at 29 feet due to boulder. Offset 6' east and blank drilled to 30 feet. Offset boring advanced to 48 feet with 4-1/4" HSA with auger refusal at 48 feet. Piezometer installed in borehole with tip at 48 feet. The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual. NORTHING **BORING STARTED AECOM OFFICE** Denver 1389079.288 BORING COMPLETED 11/2/12 EASTING ENTERED BY AMH SHEET NO. 2268257.515 RIG/FOREMAN

CME 85/Rory Pilmore APP'D BY WL AECOM JOB NO. **60239818** W.L. @ 27.1 W.S.

60239818 RICO-UPDATED 4-8-13.GPJ FS DATATEMPLATE.GDT 4/29/13

AECOM LOG

State of Wisconsin Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

			Ro	oute To:		/Wastewater □		ste Manag	gement								
														Pa	ge 1	of	2
Facilit	y/Proje	ct Nar	ne				Licer	nse/Permi	t/Moni	toring 1	Numbe	r	Boring	Numb	er		
					, Colorado			ARCOE							EW		
7.4	Penn	70.0	Name	of crew o	chief (first, las	st) and Firm	Date	Drilling !	Started		Da	ite Drill	ling Co	mplete	d	Dril	ling Method
	ne-W		n					11/2	0/200)4			11/21	/2004		00	dex
WIU	nique V	Vell No).	DNR '	Well ID No.	Common Well N	lame Final	Static W		vel	C 000 C	e Eleva		-	Bo		Diameter
Local	Grid O	rigin	M (e	stimated:	D) or F	EW-1	_1_	Feet	Site			3,850.		t Site		5.0	inches
	Plane	i i g i ii	M (c	armineu.	N,	E S/C/N		Lat	0	•		Local	Olid E	M 🖾			⊠ E
NW		of N	W	/4 of Sec		T 40 N, R 10		ong	9	1.9.	· ·			et 🗆 S		58176	Feet W
Facili	ty ID			7	County		County	y Code		Town/Colo			e				
Sar	nple							-	Kice), COR	lado		Soil	Prop	erties		
		1			Soil	Rock Description				6				1100	Cities		
0		Blow Counts	Depth In Feet		And (Geologic Origin For						Compressive Strength					st
Number and Type	Length Att. Recovered (× C	T th		E	ach Major Unit		CS	Graphic	Well Diagram	PID/FID	npre	Moisture	bid ir	Plasticity Index	200	RQD/ Comments
Nur						*		S D	Grap	Well Diagr	PID	Cor	Cor	Liquid Limit	Plastic Index	P 20	RQD/
SS	24	17-20 15-11	-			dense, GRAVEI						35					Note: Compressive
Ľ	4		-2				S. W. C.		\bowtie	×	n.						Strength = SPT N value
2 SS	24	5-7	E			n dense, fine to d EY SAND, with				1 1	m	14		1			Note: Length
55		7-7	-4	District.	120 200 720		B	SC			r						att. on split spoon = 24"
3 1	24	5-11	5					00				16		1			
ss x	2,	5-2	-6									10		1			
L			Ε	Brow	vn, loose, f	ine to coarse gra	ained,	SC				1					
SS X	24	6-3	-8		YEY SAN	very dense, fin	e to coars	se				10	B	1			
1			Ē.,	grain	red, CLAY	EY SAND and	gravel										K
5 SS	24	2-8	-10					1				12	1				
SS		4-5	=										1	Į.			
10	6	11.3	=12										1	1			
SH	24	5-4 2-4	- 14									6	1				approx. 6 inches
6 SS		24	-14					SC									recovery
2 SH	24		-16										1				
			F														
SS X	24	6-8 10-8	-18									18					1
1	1		E											1			1
			-20														
			E														
8	24	50	-22	Brou	vn_grav_ve	ry dense, fine-c	narce	-	656	4		50					
SS		30				sand and clay	varse	GP	000	1		30					
			-24			111111111111111111111111111111111111111			200	H							
		fy that	the in	formation	on this form	is true and correct											
Signa	ture	10	w	0	K. Kee	Firm	SEH	Inc	Chippey	nette Dri va Falls,	WI 54	729					: 715.720.6200
	1	10	w	V	100	,			www.se	hinc.con	n	201				Fax	: 715.720.6300

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

SOIL BORING LOG INFORMATION SUPPLEMENT Form 4400-122A

Sam	ple	er	EW	-1 Use only as an attachment to Form 4						Soi	1 Pro	-	of 2	
	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture		Limit	P 200	RQD/ Comments
			-26	Brown-gray, very dense, fine-coarse GRAVEL, with sand and clay	GP									
			-28	End of boring at 28' (refusal)										
1														

State of Wisconsin Department of Natural Resources

Route To:

Watershed/Wastewater

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

The state of the s	(D	- N				1.7	/D					las :		ge 1	of	1	
Facility/Project Name St. Louis Ponds Area, Rico, Colorado							License/Permit/Monitoring Number Box AARCOE0105.00							oring Number EW-2A			
Boring Drilled By: Name of crew chief (first, last) and Firm													illing Completed			Drilling Method	
Jeff Pennell																	
Layne-Western WI Unique Well No. DNR Well ID No. Common Well Name							11/21/2004 Final Static Water Level Su				11/21/2004					odex	
WI Unique Well No. DNR Well ID No. Common Well Name							Feet		vel		urface Elevation Bor 8,846.4 Feet Site					5.0 inches	
Local Grid Origin (estimated:) or Boring Location							1				Local Grid Location					inches	
State				N,	E S/C/N	L			-				× N			⊠ E	
NW 1/4 of NW 1/4 of Section 25, T 40 N, R 10 W Facility ID County G							g	Civil	Form/C	ib/ or		98 Fee	et 🗌 S	226	8004	Feet W	
Facility ID County							unty Code Civil Town/City/ or Village Rico, Colorado										
Sample								31100	,	,,,,,		Soi	Prop	erties			
	Soil/Rock Description										0.						
, e	Length Att. & Recovered (in)	Blow Counts	Depth In Feet		Geologic Origin For				e		Compressive Strength	0		2		nts	
Number and Type	Length Att. Recovered (W C	pth I	Ea	ich Major Unit		SCS	Graphic Log	Well Diagram	PID/FID	mpre	Moisture Content	Liquid	Plasticity Index	00	RQD/ Comments	
an N			De				D	Grap	Well Diagr	PII	Str	° S	5.2	Plastic Index	P 200		
1 SS	24	1-3 12-9	3		lense, GRAVELL' ganics in surface s			$\Rightarrow \Rightarrow$			15					Note: Compressive	
V			-2	Brown, loose, fi	ne to coarse grains											Strength = SPT N value	
SS X	24	24 3-7 CLAYEY SAND, with gravel.				SC				11					Note: Length		
22		4-5	-4													att. on split spoon = 24"	
3 1	24		2	Brown loose S	ANDV CLAV to	rlavev											
3 SS	Brown, loose, SANDY CLAY to c sand, with gravel.		layey	CL						1							
V						CL		1				1					
SS X	24	3-4	-8	Brown, medium stiff, SANDY CLA							7						
1		(1)		with gravel		CL-M											
5 SS	24	5-8	-10	Brown, stiff, SANDY CLAY to clay		ayey					16						
SS		8-17		sand, with grave	el		CL-M										
-			-12	End of boring at 12' (abandoned)				1111									
				C.10.200 - 22.00							1						
											1						
										1		1					
												1		1			
I here	ov certi	fy that	the inf	Ormation on this form	is true and correct to the	ne hest of n	av kno	vledae			1	-	1		-		
Signa		ij mat	are iiii	00			A	21 Fren	ette Dri						*	. 71 5 700 20	
1		w		K-Keld	SI	EH I	nc	Chippew	a Falls,	WI 54	729					l: 715.720.6200 :: 715.720.6300	

Waste Management

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

SOIL BORING LOG INFORMATION SUPPLEMENT Form 4400-122A

Sam	ple	er	EW	-1 Use only as an attachment to Form 4						Soi	1 Pro	-	of 2	
	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture		Limit	P 200	RQD/ Comments
			-26	Brown-gray, very dense, fine-coarse GRAVEL, with sand and clay	GP									
			-28	End of boring at 28' (refusal)										
1														

			Rico - Argentine Mine Site	Richfield Company	LOG OF BOR	ING NU	IVIDER	MW-	201				
AEC	Т.	M					ARCHITECT-E	ENGINE	ER				
				ı	Rico - A	rgentine Mine Site	Anderson	Eng	ineering	G Con	npany,	Inc.	
E LOCA						<u> </u>			- LINICO	NICINICD	COMPRES	SIVE STR	RENGT
Rico-	-Ar	gen	ti	ne)				1	5/FT. ²	3	4 !	5
N(FT)			NCE						PLASTIC		WATER ONTENT %		QUID IIT %
ELEVATION(FT)	E NO.	SAMPLE TYPE	SAMPLE DISTANCE	/ERY		DESCRIPTION OF MATERIAL		UNIT DRY WT. LBS./FT.³	10	20	30	40 5	<u>←</u> 50
- 3	SAMPLE NO.	SAMPL	SAMPL	RECOVERY	SURFACE	ELEVATION Feet	,	UNIT D LBS./F	⊗ 10		NDARD NETRATION 30		/(FT) 50
	1 :	SON	_			Fill - 0% boulders, 2% cobble, 50% gravel, 12% coarse sand, 12% medium sand, 14% fine sand 10% fines, 0% organics - 7.5 YR 3/2							
		SON	-		8.5	Waste Rock - 0% boulder, 0% cobble, 40% gravents of the sand, 5% fines, 0% organics - 10 YR 5/6 o.5-inch black waste material (coal cinders) Perched water at 9.0 feet through sandy gravelless than 6.0 inches thick Waste Rock - 0% boulder, 2% cobble, 40% gravents of the sandy gravelless than 6.0 inches thick	layer						
san	san Cle	san Cle	san Cle	san Cle	san	% coarse sand, 15% medium sand, 15% fine id, 13% fines, 0% organics - 10 YR 3/3 an limestone cobble zone from 13.0-14.0 fee							
4 S	S	ON			20.0		5%						
						Colluvium/Alluvium Mix - 0% boulder, 0% cobble 30% gravel, 15% coarse sand, 15% medium sa 20% fine sand, 20% fines, trace organics - 7.5 3/2 Water Test at 20.0 feet	nd,						
	5	SON				Jumbled chunks of black organic silt and sand a 26.0 feet	at						
						Severly weathered red sandstone gravels from 2	29.0						
-	-+	-+	-'+	+	P 413 412444	_to_30.0_feet	 d		+-			 	+-

				1	CLIENT		LOG (OF B	BOR	NG NU	MBER	M	W-20	1		
		24	4	١,	Atlantic	Richfield Company										
AΞ	C	JN	1		PROJECT N		ARCH	IITE	CT-E	NGINE	ER					
					Rico - Ar	gentine Mine Site	And	ers	son	Eng	ineer	ing C	omp	any, I	nc.	
SITE LO	CAT	ION								Ŭ		NCONE	NED CO	MPRESS	IVE STR	ENGTH
Ric	o-A	rge	nti	ine)						U Т	DNS/FT.	2	3 4	1 :	5
											PLA		-	TER		UID
DEPTH(FT) ELEVATION(FT)		Щ	SAMPLE DISTANCE			DESCRIPTION OF MATERIAL				L.	LIM	IT % ← — –	CONT	ENT %		IT %
DEPTH(FT) ELEVATION	SAMPLE NO.	SAMPLE TYPE	E DIS	RECOVERY						UNIT DRY WT. LBS./FT.³	1	0	-	-	0 5	50
	MPI	MPI	MPI	000						S./F	6	3	STAND	ard Ration I	RI OWS/	(FT)
\times	SA	δ	δ	꼾		ELEVATION Feet	(Con	tinu	ed)	5 9						50
			Н		30.5	Cally in m/Ally sign Mix 00/ boulder 50/ aabble			+							
	6	SON	1		33.0	Colluvium/Alluvium Mix - 0% boulder, 5% cobble 55% gravel, 10% coarse sand, 10% medium sar 10% fine sand, 10% fines, 0% organics - 7.5 YF	nd,									
			Ħ	П	00.0	Colluvium/Alluvium Mix - 0% boulder, 5% cobble),									
	1					50% gravel, 10% coarse sand, 10% medium sar 10% fine sand, 15% fines, 0% organics - 2.5 YF	nd, 25/3									
35.0						Water at 33.0 feet	. 3/3	[: <u> </u>	∄:							
	7	SON				Grades to 7.5 YR 4/3 at 35.0 feet		E	#							
	1							:	∄ .∵							
				۲				E	∄ ::.							
			Н		37.5				-							-
								l: F	∃ :`.							
			-	-	1	Limentone Cabbles 20/ bander 20/ cabble 55	0/	F	∄::							
40.0	-					Limestone Cobbles - 0% boulder, 2% cobble, 55 gravel, 15% coarse sand, 10% medium sand, 10%		ĿΈ	∄∵							
70.0	Ī					fine sand, 8% fines, 0% organics - 7.5 YR 4/4	70	l: E	∃.							
						Water Test at 40.0 feet		l	∄ .							
	-							l: E	∄.`							
	1							l: E	∄ `:.							
								l	₫							
	-					Grades to 7.5 YR 4/4										
	-															
45.0	8	SON							::							
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				Н												
	1															
	1					Grades to 5 YR 4/4										
50.0			\coprod		50.0				1.							
	-		$\ \ $			Alluvium - 0% boulders, 0% cobbles, 60% grave	l,	R	36							
	1					10% coarse sand, 15% medium sand, 10% fine sand, 5% fines, 0% organics - 5 YR 4/4		数								
]					Water Test at 50.0 feet		100	Š							
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-	1															
	1		$\ \ $.••			粉	BR							
FF ^	-		$\ \ $. 6.	Madium and and the section of the se	_1	R		}						
55.0	9	SON				Medium coarse sand lense from 54.5 to 55.0 fee) [滋								
					7.5			13	Š							
	-					Small coal particle - gravel-sized		2		}						
-	1		$\ \ $					K								
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60.0	<u> </u>		\coprod	_	60.0			X								
						continued	l									
The -4- '	ifice.	on !!			nont the c	vimate houndary lines between sell-times in alter the 1000	n mari-	~	dura!	AEC	OM JOB	NO.		HEET NO). (OF
ine strat	ıııcatı	uri iine	s re	pre	sent the appro	ximate boundary lines between soil types: in situ, the transitio	ıı ıııay be	grac	ual.		6	02398	18		´ 2 `	3

					LIENT	LOG OF E	BORI	NG NU	MBER	MW-	201		
Δ	ECC	74	1		Atlantic Richfield Company	ADOLUTE	OT 5						
7-			•		ROJECT NAME RICO - Argentine Mine Site	ARCHITE			⊨∺ ineering	Con	nany	Inc	
SITE L	OCAT	ION		- '	NCO - Argentine mine one	Aluei	3011	Liig	UNCON	IFINED	COMPRES	SSIVE S	STRENGTH
Ri	co-A	rge	ntir	ıe					-O-UNCON TONS/F	T. ²	3	4	5
DEPTH(FT)		ш	SAMPLE DISTANCE		DESCRIPTION OF MATERIAL				PLASTIC LIMIT %	C	WATER ONTENT %		LIQUID LIMIT %
DEPTH(FT)	NO.	ΙΥΡ	SIG		DESCRIPTION OF MATERIAL			۲¥ WT	10	20	30	40	50
	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIS					UNIT DRY WT. LBS./FT.³	8		.NDARD IETRATION	I BLOV	VS//ET)
X	SA	S,	S F	2	SURFACE ELEVATION Feet End of Boring	(Continu	ıed)	E 5	10	20	30	40 1	50
60239818 RICO-UPDATED 10-11-13.GPJ FS_DATATEMPLATE.GDT 10/15/13 SD H コココココココココココココココココココココココココココココココ					Note: Water testing data and interpreted hydrat conductivity are documented seperately	ulic							
8 RC													
239816		The	strati	fic	ation lines represent the approximate boundary lines between	en soil types	s: in	situ, th	ne transition	may	be gradua	al.	
	NG				BORING STARTED		AEC	OM OFF	ICE D	enver			
EASTING	G				BORING COMPLETED		ENT	ERED B'	Y S	HEET	NO. C)F	
EASTING WL WL					RIG/FOREMAN Boart/Longyear Sonic 300/Ri	ick Mallet	APP'	D BY		ECOM	JOB NO. 6023 9		













CLIENT LOG OF BORING NUMBER MW-202 **Atlantic Richfield Company DRAFT** A=COM PROJECT NAME ARCHITECT-ENGINEER **Rico - Argentine Mine Site** Anderson Engineering Company, Inc. -O-UNCONFINED COMPRESSIVE STRENGTH SITE LOCATION TONS/FT.² **Rico-Argentine** PLASTIC WATER LIQUID SAMPLE DISTANCE **ELEVATION(FT** LIMIT % CONTENT % LIMIT % DEPTH(FT) - -SAMPLE TYPE **DESCRIPTION OF MATERIAL** UNIT DRY WT. LBS./FT.³ SAMPLE NO. RECOVERY 10 30 50 STANDARD ⊗ 10 PENETRATION BLOWS/(FT) SURFACE ELEVATION +8,859.2 Feet FILL: Well graded gravel, some sand, little silt -57% gravel, 30% sand, 13% fines - 10YR3/2 -SON 1 (FILL: GM) Clayey sand and gravel, some silt - 35% gravel, 40% fine to coarse sand, 25% fines - 7.5YR4/3 (SC) 2,3 SON 5.0 Well graded clayey gravel and sand, little silt -7/5YR4/3 (GW-GC) Clayey sand and gravel, some silt - 35% gravel, 3,4 SON 10.0 40% fine to coarse sand, 25% fines - 7.5YR4/3 Well graded sand, some gravel, little silt - 20% gravel, 71% fine to coarse sand, 9.3% silt -10YR4/3 (SW-SM) 15.0 5 SON 20.0 6 SON FS DATATEMPLATE.GDT Well graded sand, some gravel, little silt - 20% gravel, 71% fine to coarse sand, 9.3% silt - 10YR4/4 (SW-SM) 25.0 60239818 RICO-UPDATED 4-8-13.GPJ 7 SON 30.0 ... continued AECOM LOG AECOM JOB NO. 60239818 SHEET NO. The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

	CLIENT		LOG OF BORII	NG NUM	IBER	MW-202	
AECOM	Atlantic Richfield Con	npany	DRAFT ARCHITECT-E	NONE	-D		
A_CO///	Rico - Argentine Mine	Sito	Anderson			Company	Inc
SITE LOCATION	Thoo Argentine inine	Oite	Allacison		UNCON	IFINED COMPRE	SSIVE STRENGTH
Rico-Argentir	ne				TONS/F	2 3	4 5
BEPTH(FT) ELEVATION(FT) SAMPLE NO. SAMPLE TYPE SAMPLE DISTANCE	5500				PLASTIC LIMIT %	WATER	LIQUID % LIMIT %
DEPTH(FT) ELEVATION PLE NO. PLE TYPE PLE DISTAI	DESC⊦	RIPTION OF MATERIAL		WT	10	20 30	40 50
DEPTH(FT ELEVATIO) SAMPLE NO. SAMPLE TYPE SAMPLE DISTA	ONE			UNIT DRY WT. LBS./FT.³	•	STANDARD	
SAM SAM	SURFACE ELEVATION +8	3,859.2 Feet	(Continued)	UNI	⊗ 10	PENETRATIO 20 30	N BLOWS/(FT) 40 50
8 SON 35.0	Well graded sa gravel, 71% fin 10YR4/4 (SW-S	nd, some gravel, little silt - 20° e to coarse sand, 9.3% silt - SM)	%				
RB	Blind Drilling						
38.8	38.8						
	feet with sonic advanced to 38	t 38.8 ft. Boring advanced to 3: drilling techniques, boring .8 feet using mud rotary .2 cometer installed with tip at 38					
	ation lines represent the appr	oximate boundary lines betwee				ion may be g	radual.
NORTHING 1388999	649	BORING STARTED 11/8/12		OM OFFI		enver	
EASTING 2268195	.978	BORING COMPLETED 11/11/12		ERED BY	1	HEET NO.	OF 2
^{NL} W.L. @ 2	22.5' W.D.	RIG/FOREMAN AMS Compact Sonic 10-C/Ky	le King APP	'D BY	A	ECOM JOB NO. 602 :	39818

PROJECT NAME RICO - Argentine Mine Site Roco Argentine Roco Argentine Mine Site Roco Argentine Mine Site Roco Argentine Roco Argent						CLIENT	LOG OF BORI	NG NUN	MBER MV	/-203	
Rico - Argentine Rico - Arge	A =		34	4		Atlantic Richfield Company					
Colluvium - 0% cobble - 40% gravel - 15% coarse sand - 15% medium sand - 15% fines and - 10% fines, 0% organics - 10 VR 4/4 Son 4 Son Colluvium - 0% cobble - 40% gravel - 15% coarse sand - 15% fines and - 15% fines	A=	U	JIY		F	PROJECT NAME	ARCHITECT-E	NGINE	ER		
Colluvium - 0% cobble - 40% gravel - 15% coarse sand - 15% medium sand - 15% fines and - 10% fines, 0% organics - 10 VR 4/4 Son 4 Son Colluvium - 0% cobble - 40% gravel - 15% coarse sand - 15% fines and - 15% fines						Rico - Argentine Mine Site	Anderson	Engi	neering Co	mpany, Ir	nc.
DESCRIPTION OF MATERIAL DESCRIPTION OF M	ITE LOC	CATIO	ON							ED COMPRESS	SIVE STREN
DESCRIPTION OF MATERIAL Section DESCRIPTION OF MATERIAL DESCRIPTION	Ricc)-A	rger	ntii	ne				TONS/FT. ²	3	4 5
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1 SON	ELEVATION	o.	YPE	IST,	≻	DESCRIPTION OF MATERIAL		M M		_	
1 SON	. 2	Щ	Щ.	E D	ÆR			Ž °	10 20	30	40 50
Colluvium - 0% cobble, 40% gravel, 15% coarse sand, 15% medium sand, 15% fine sand, 15% fines, trace 1 SON	<u> </u>	MPL	MPL	MPL	8			IT D	S S		DI OMO//ET
15% medium sand, 15% fine sand, 15% fines, trace organics - 7.5 YR 3/2 2 SON		SA	S,	SA	R			3 9			
organics - 7.5 YR 3/2 1 SON						Colluvium - 0% cobble, 40% gravel, 15% coal	rse sand,				
1 SON				Ш	Ш	15% medium sand, 15% fine sand, 15% fines	, trace				
Colluvium - 2% cobble, 35% gravel, 15% coarse sand, 15% medium sand, 13% fine sand, 20% fines, 0% organics - 10 YR 4/3 2 SON 10.0 3 SON 11.5 Colluvium - 0% cobble, 30% gravel, 20% coarse sand, 20% medium sand, 10% fines, 0% organics - 10 YR 4/4 Perched water 4 SON 4 SON 4 SON 21.0 Colluvium - 0% cobble, 40% gravel, 15% coarse sand, 15% medium sand, 15% fine sand, 15% fines, 0% organics - 7.5 YR 3/2 5 SON 5 SON Colluvium - 0% cobble, 50% gravel, 11% coarse sand, 12% medium sand, 12% fine sand, 15% fines, 0% organics - 10 YR 4/3 6A SON 6A SON continued				Ш	Ш	Organics - 7.5 TK 3/2					
Colluvium - 2% cobble, 35% gravel, 15% coarse sand, 15% medium sand, 13% fine sand, 20% fines, 0% organics - 10 YR 4/3 2 SON 10.0 3 SON 11.5 Colluvium - 0% cobble, 30% gravel, 20% coarse sand, 20% medium sand, 10% fines, 0% organics - 10 YR 4/4 Perched water 4 SON 4 SON 4 SON 21.0 Colluvium - 0% cobble, 40% gravel, 15% coarse sand, 15% medium sand, 15% fine sand, 15% fines, 0% organics - 7.5 YR 3/2 5 SON 5 SON Colluvium - 0% cobble, 50% gravel, 11% coarse sand, 12% medium sand, 12% fine sand, 15% fines, 0% organics - 10 YR 4/3 6A SON 6A SON continued				Ш	Ш						
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4.0-inch+ cobble 4.0-inch+ cobble 21.0 Colluvium - 0% cobble, 40% gravel, 15% coarse sand, 15% medium sand, 15% fine sand, 15% fines, 0% organics - 7.5 YR 3/2 5 SON 5.0 Colluvium - 0% cobble, 50% gravel, 11% coarse sand, 12% medium sand, 12% fine sand, 15% fines, 0% organics - 10 YR 4/3 continued						o o o o o o o o o o o o o o o o o o o					
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21.0 Colluvium - 0% cobble, 40% gravel, 15% coarse sand, 15% medium sand, 15% fine sand, 15% fines, 0% organics - 7.5 YR 3/2 5 SON Colluvium - 0% cobble, 50% gravel, 11% coarse sand, 12% medium sand, 12% fine sand, 15% fines, 0% organics - 10 YR 4/3 continued						~ ~ d o d o d o d o d o d o d o d o d o d o d o d o d o d o d o o					
21.0 Colluvium - 0% cobble, 40% gravel, 15% coarse sand, 15% medium sand, 15% fine sand, 15% fines, 0% organics - 7.5 YR 3/2 5 SON Colluvium - 0% cobble, 50% gravel, 11% coarse sand, 12% medium sand, 12% fine sand, 15% fines, 0% organics - 10 YR 4/3 continued	-										
21.0 Colluvium - 0% cobble, 40% gravel, 15% coarse sand, 15% medium sand, 15% fine sand, 15% fines, 0% organics - 7.5 YR 3/2 5 SON Colluvium - 0% cobble, 50% gravel, 11% coarse sand, 12% medium sand, 12% fine sand, 15% fines, 0% organics - 10 YR 4/3 continued					Н						
5 SON 26.0 Colluvium - 0% cobble, 40% gravel, 15% coarse sand, 15% medium sand, 15% fine sand, 15% fines, 0% organics - 7.5 YR 3/2 5 SON 26.0 Colluvium - 0% cobble, 50% gravel, 11% coarse sand, 12% medium sand, 12% fine sand, 15% fines, 0% organics - 10 YR 4/3 6A SON 6.4 SON continued						ុំ្ងៃ្រៀ 4.0-inch+ cobble					
5 SON 26.0 Colluvium - 0% cobble, 40% gravel, 15% coarse sand, 15% medium sand, 15% fine sand, 15% fines, 0% organics - 7.5 YR 3/2 5 SON 26.0 Colluvium - 0% cobble, 50% gravel, 11% coarse sand, 12% medium sand, 12% fine sand, 15% fines, 0% organics - 10 YR 4/3 6A SON 6.4 SON continued	0.0					。					
Colluvium - 0% cobble, 40% gravel, 15% coarse sand, 15% medium sand, 15% fine sand, 15% fines, 0% organics - 7.5 YR 3/2 5 SON Colluvium - 0% cobble, 50% gravel, 11% coarse sand, 12% medium sand, 12% fine sand, 15% fines, 0% organics - 10 YR 4/3 6A SON continued	J. V										
15% medium sand, 15% fine sand, 15% fines, 0% organics - 7.5 YR 3/2 5.0 Colluvium - 0% cobble, 50% gravel, 11% coarse sand, 12% medium sand, 12% fine sand, 15% fines, 0% organics - 10 YR 4/3 6A SON continued			Н	Щ	H		200 0024				+ +
5 SON 26.0 Colluvium - 0% cobble, 50% gravel, 11% coarse sand, 12% medium sand, 12% fine sand, 15% fines, 0% organics - 10 YR 4/3 6A SON 6. Colluvium - 0% cobble, 50% gravel, 11% coarse sand, 12% medium sand, 12% fine sand, 15% fines, 0% organics - 10 YR 4/3						15% medium sand 15% fine sand 15% fines	se sand, 0%				
5 SON 26.0 Colluvium - 0% cobble, 50% gravel, 11% coarse sand, 12% medium sand, 12% fine sand, 15% fines, 0% organics - 10 YR 4/3 6A SON continued						organics - 7.5 YR 3/2	, 576				
26.0 Colluvium - 0% cobble, 50% gravel, 11% coarse sand, 12% medium sand, 12% fine sand, 15% fines, 0% organics - 10 YR 4/3 6A SON continued											
Colluvium - 0% cobble, 50% gravel, 11% coarse sand, 12% medium sand, 12% fine sand, 15% fines, 0% organics - 10 YR 4/3 6A SON continued		5	SON								
Colluvium - 0% cobble, 50% gravel, 11% coarse sand, 12% medium sand, 12% fine sand, 15% fines, 0% organics - 10 YR 4/3 6A SON continued					Ш						
Colluvium - 0% cobble, 50% gravel, 11% coarse sand, 12% medium sand, 12% fine sand, 15% fines, 0% organics - 10 YR 4/3 6A SON continued	5.0										
Colluvium - 0% cobble, 50% gravel, 11% coarse sand, 12% medium sand, 12% fine sand, 15% fines, 0% organics - 10 YR 4/3 6A SON continued						26.0					
6A SON continued continued				П	П	Colluvium - 0% cobble, 50% gravel, 11% coal					
6A SON continued							, 0%				
O.O continued						organics - 10 YR 4/3					
O.O continued		•									
continued	-	6A	SON			·////					
continued	0.0	_			Щ	9//2		L_			1
			[- [-"	T	continued			+		ކ:
The stratification lines represent the approximate boundary lines between soil types: in situ the transition may be gradual. AECOM JOB NO. SHEET NO. OF						33/11/1433					
The stratification lines represent the approximate boundary lines between soil types: in situ the transition may be gradual. AECOM JOB NO. SHEET NO. OF											
The stratification lines represent the approximate boundary lines between soil types: in situ the transition may be gradual AECOM JOB NO. SHEET NO. OF											
The stratification lines represent the approximate boundary lines between soil times: in situ the transition may be gradual AECOM JOB NO. SHEET NO. OF								<u> </u>			
The stratification lines represent the approximate boundary lines between soil types. In situ, the transition may be gradual.	The str	atifica	tion lin	es r	enr	esent the approximate houndary lines between soil types: in situ. the transition	may be gradual	AEC	OM JOB NO.	SHEET N	O OF

					CLIENT	LOG OF BORI	NG NUN	MBER MW-203
A		7 4	A		Atlantic Richfield Company			
A=	C	JN	/		PROJECT NAME	ARCHITECT-E		
					Rico - Argentine Mine Site	Anderson	Engi	ineering Company, Inc.
SITE LO								-O-UNCONFINED COMPRESSIVE STRENGT TONS/FT. ² 2 3 4 5
Ric	O-A	rge	ntı	ne	<u>e</u>			2 3 4 5
T) ON(FT)		ш	'ANCE		DESCRIPTION OF MATERIAL			PLASTIC WATER LIQUID LIMIT % CONTENT % LIMIT % X
DEPTH(FT) ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY			UNIT DRY WT. LBS./FT.³	10 20 30 40 50 STANDARD
	SAM	SAM	SAM	IS S	SURFACE ELEVATION Feet	(Continued)	UNI LBS.	
			Τ		Y // 4	,		
	-				31.5			
	6D	son			Colluvium - 0% cobble, 50% gravel, 10% coars 10% medium sand, 15% fine sand, 15% fines, organics - 10 YR 5/4 Severely weathered gray cobbles	se sand, 0%		
35.0		501			0 35.0			
			Ц	L	36.0 Intact boulder			
40.0	7	SON	1		Colluvium - 0% cobble, 50% gravel, 12% coars 12% medium sand, 12% fine sand, 14% fines, organics - 5 YR 4/3	se sand, 0%		
40.0			Ħ	T	♦ ₹ 40.0 Colluvium - 0% cobble, 50% gravel, 12% coars	se sand,		
45.0	8	SON	V		12% medium sand, 13% fine sand, 15% fines, organics - 2.5 YR 4/2	0%		
0.00	9	son	1		Alluvium/Colluvium - 0% cobble, 60% gravel, 1 sand, 10% medium sand, 10% fine sand, 10% organics - 5 YR 3/3	10% coarse fines, 0%		
AECOM LOG 602339818 RICO-UPDATED 4-8-13. GPJ FS_DATATEMPLATE. GDT 1								
-8-	_			ļ.	57.0	4.40/		
4/CO-UPDATED (10	son	1		Alluvium/Colluvium - 5% cobble, 50% gravel, 1 sand, 11% medium sand, 11% fine sand, 12% organics - 7.5 YR 4/3			
818]	[Τ.	ľ	continued			<u> </u>
OM LOG 60239								
The st	tratifica	ation li	nes	repi	present the approximate boundary lines between soil types: in situ, the transition n	nay be gradual.	AECO	OM JOB NO. SHEET NO. OF 2

					1	LIENT		LOG OF BC	RING	NUN	/IBER	MW-	203		
	Δ=	Atlantic Richfield Company PROJECT NAME Rico - Argentine Mine Site		ADOLUTEO:											
	7-		<i>)</i>	•	1			ARCHITEC			:∺ ineering	Com	nany	Inc	
	SITE LO	CATIO	ON.		[Aco - Argentine Mine Site		Anders		ngı	UNCO	NFINED	COMPRES	SSIVE ST	RENGTH
	Ric			ntir	ıе						TONS/	FT. ²	COMPRES	4	5
												-		١.	
	Z(FT)			NCE							PLASTIC LIMIT %	С	WATER ONTENT %		IQUID MIT %
	DEPTH(FT) ELEVATION(FT)	o.	YPE	SAMPLE DISTANCE	╮	DESCRIPTION C	F MATERIAL		Ę	LBS./FT.³					
	EPT!	LE	LET	LED	Æ				DRY	ř.	10	20	30	40	50
		SAMPLE NO.	SAMPLE TYPE	AMP	잂	SURFACE ELEVATION Feet		(Continue	√/ <u>F</u>	BS./F	⊗	PEN	NDARD NETRATION	N BLOW	S/(FT)
		S S	S	S	T	Alluvium/Colluvium - 5% (cobble, 50% gravel, 1		u) = e		10	20	30	40	50
						sand, 11% medium sand,	11% fine sand, 12%	fines, 0%							
	62.0			Ш		organics - 7.5 YR 4/3									
						End of Boring									
3															
14/13															
10															
3DT															
TE.															
1PLA															
Ē															
ΑTΑ															
S															
7															
3.G															
4-8-1															
Ë															
DAT															
7															
RIC		<u></u>													
9818		The	strat	tific	ati	on lines represent the approximate bo	oundary lines between	n soil types	s: in:	situ,	the transit	ion m	ay be gr	adual.	
60239818 RICO-UPDATED 4-8-13.GPJ FS_DATATEMPLATE.GDT 10/14/1	NORTHING	G				BORING ST	ARTED	A	AECOM	OFF	ICE n	enver			
.0G	EASTING					BORING CO						HEET 1	NO.	OF	
AECOM LOG									ENTER				3	3	
AEC	WL					RIG/FOREM Boart/Lo	^{AN} <mark>ngyear Sonic 300/Ricl</mark>	k Mallet	APP'D E	1		NECOIM	JOB NO. 6023	9818	

CLIENT LOG OF BORING NUMBER MW-204 **Atlantic Richfield Company DRAFT AECOM** PROJECT NAME ARCHITECT-ENGINEER **Rico - Argentine Mine Site** Anderson Engineering Company, Inc. -O-UNCONFINED COMPRESSIVE STRENGTH SITE LOCATION TONS/FT.² **Rico-Argentine** PLASTIC WATER LIQUID SAMPLE DISTANCE **ELEVATION(FT** LIMIT % CONTENT % LIMIT % DEPTH(FT) $-\!\!\triangle$ SAMPLE TYPE **DESCRIPTION OF MATERIAL** UNIT DRY WT. LBS./FT.³ SAMPLE NO. RECOVERY 10 30 50 STANDARD ⊗ 10 PENETRATION BLOWS/(FT) SURFACE ELEVATION +8,866.0 Feet Well graded sandy gravel, trace silt, slightly moist - 74% gravel, 23% sand, 3% fines - 5YR3/1 (GW) 1 SON 5.0 Approximate top of timbers in nearby St. Louis Adit @ 6.5' Well graded sandy gravel - 50% gravel (subangular to subrounded), 35% sand, 15% 2 SON fines- slightly moist to moist - 7.5YR4/3 (GW-GC) Approximate level of flowing water in adit 15'-20' 10.0 away @ 8.0'. Well graded sandy gravel, trace silt, slightly moist - 67% gravel, 30% sand, 3% fines - 10YR4/2 (GW) Well graded sandy gravel = 60% gravel (subangular to subrounded), 30% sand, 10% fines 4 SON - saturated - 10YR4/4 (GW-GC) NOTE: Possible perched groundwater at 12 feet. (Approx elev. = 8854 ft) 15.0 No sampling from 15'-21 Boulders and cobbles, rough drilling, lost approximately 150 gallons of drilling mud. RB 20.0 Well graded sandy gravel, trace silt - 60% gravel (angular to subrounded), 25% sand, 15% fines -5YR3/3 (GW-GM) 5 SON 25.0 No sampling from 25.5'-31.5' RB 30.0 ... continued AECOM JOB NO. 60239818 SHEET NO. The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

DATATEMPLATE.GDT

FS

60239818 RICO-UPDATED 4-8-13.GPJ

AECOM LOG

					IENT		LOG OF BOR	ING NUI	MBER	MW-20)4		
A	C	٦A	1		tlantic Richfield Com	npany	DRAFT ARCHITECT-	ENIONE	-D				
	•	<i>-</i>	•		ico - Argentine Mine	Sito	Anderso			Comp	anv I	nc	
SITE LO	CATIO	ON		- 1	ico - Ai gentine mine	Oite	Alluciso		-O-UNCO	NFINED CO	OMPRES	SIVE STR	RENGTH
Rice			ntin	е					-O-UNCOR	FT. ²	3	4	5
DEPTH(FT) ELEVATION(FT)			SAMPLE DISTANCE				·		PLASTIC LIMIT %	CON	ATER ITENT %	LIM	UID
DEPTH(FT) ELEVATION	9	IYE	JIST,	-	DESCR	RIPTION OF MATERIAL		, MT	10	20			5 0
DEPT	SAMPLE NO.	SAMPLE TYPE	PLE					DRY FT.³	10	STANE	-	1	+
\overline{X}	SAM	SAM	SAM	2 8	SURFACE ELEVATION +8	s,866.0 Feet	(Continued)	UNIT DRY WT. LBS./FT.³	⊗ 10		TRATION		/(FT) 50
					No sampling fro	om 25.5'-31.5'							
31.5					31.5								
					sonic equipmen 25.5 feet. Boring	g 31.5'. Boring advanced with and mud rotary techniques to g advanced to 31.5' with mud es. Piezometer installed with tip							
	The	stra	tifica	tion	n lines represent the appro	oximate boundary lines betwee	en soil types:	in situ,	the transit	ion may	be gra	dual.	
NORTHING						BORING STARTED		COM OFF	ICE	enver			
EASTING			122.			11/5/12 BORING COMPLETED 11/6/12		TERED B	Υ [§	SHEET NO	0	F .	
N L		2268	373.	787	1	11/6/12 RIG/FOREMAN		AM P'D BY	н	AECOM JC	2	2	
٧L						AMS Compact Sonic 10-C/Ky	le King	וסטי		ALCOIVI JC	60239	818	

1	CLIENT	LOG OF BOR	ING NU	IMBEK MY	V-205	
A=COM	Atlantic Richfield Company					
AECOM	PROJECT NAME	ARCHITECT-I				
	Rico - Argentine Mine Site	Andersor	ı Eng	ineering Co	ompany, l	nc.
SITE LOCATION		•		-UNCONFIN	ED COMPRESS	IVE STRENGTH
Rico-Argenti	ne			TONS/FT. ²	3 4	5
DEPTH(FT) ELEVATION(FT) SAMPLE NO. SAMPLE TYPE SAMPLE DISTANCE	DESCRIPTION OF MATERIAL		÷.	PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %
DEPTH(FT) ELEVATIOI SAMPLE NO. SAMPLE TYPE SAMPLE DISTA	SURFACE ELEVATION Feet		UNIT DRY WT. LBS./FT.³	10 20	30 4 TANDARD	0 50
SAM SAM	SURFACE ELEVATION Feet		UNIT LBS.		ENETRATION E	
	Topsoil	<u> </u>		10 20	00 4	
1 SON	Fill - 75% gravel, 22% sand, 3% fines - 10 YR	4/2				
2 SON	Fill - 5% cobble, 20% gravel, 67% sand, 8% fir YR 3/2 Large cobble	nes - 5	No. (1 No			
10.0 3 SON	Colluvium - 10% cobble, 40% gravel, 40% san 10% fines - 10YR 4/4 Large cobble	4/2 dd, dd, dd, dd, dd, dd, dd, dd, dd, dd				
	14.0		1 100 T 100			
15.0 4 SON	Colluvium - 50% gravel, 45% sand 5% fines - 9 3/2		7 - 194 - 11 - 194 - 11 - 195 - 11 - 195 - 11			
52 20.0 5A SON	25% cobble, 30% gravel, 30% sand, 15% fines YR 4/3 Water encountered during drilling - perched	60 60	20. // 150. // 150. // 150. // 150. // 150.			
	Perched water during drilling	d,				
The stratification lines re	Colluvium - 20% cobble, 30% gravel, 40% san 10% fines - 10 YR 3/3	d, 3	4 No. (1			
	continue	ed				
The stratification lines rei	present the approximate boundary lines between soil types: in situ, the transit	tion may be gradual.	AEC	OM JOB NO. 6023981	SHEET NO	o. OF 6

A=		7 44			Richfield Company	LOG OF BOR			MW-205	
AE	C	JIY	•	PROJECT N		ARCHITECT-				_
				Rico - A	rgentine Mine Site	Andersor	Eng	ineering	Company,	Inc.
Rico			tin	e				-O-UNCC TONS 1	NFINED COMPRES	SSIVE STRE
DEPTH(FT) ELEVATION(FT)	ō.	YPE	SAMPLE DISTANCE		DESCRIPTION OF MATERIAL		WT.	PLASTIC LIMIT % ————————————————————————————————————	CONTENT %	
ELEV	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIS				UNIT DRY WT. LBS./FT.³	10	20 30 STANDARD	40 50
	SAN	SAN	SAN	SURFACE	ELEVATION Feet	(Continued)	LBS	⊗ 10	PENETRATION 20 30	BLOWS/(F 40 50
05.0	5B	SON			Colluvium - 20% cobble, 30% gravel, 40% s 10% fines - 10 YR 3/3					
35.0	6	SON		35.0	Colluvium - 10% cobble, 40% gravel, 45% s fines, trace organics - 10 YR 2/2 Color change 5 YR 4/3	and, 5%				
40.0	7	SON	Ш	40.0	Colluvium - 0% cobble, 15% gravel, 60% sa fines - 7.5 YR 3/2	nd, 15%				
	8	SON		42.0	Colluvium - 20% cobble, 40% gravel, 30% s 10% fines, trace organics - 2.5 YR 2.5/1 Significant black carbon content adhering to staining individual particles					
	9	SON	Ш	44.0		/				
45.0	10	SON			Colluvium - 15% cobble, 35% gravel, 40% s 10% fines - 5 YR 4/4 4.0-inch clayey zone Begin saturated zone 6.0-inch+ weathered sandstone cobble	and,				
55.0				50.0	Alluvium/Colluvium Mix - 15% cobble, 45% 25% sand, 15% fines - 7.5 YR 4/4	gravel,				
60.0	11	SON				nued				
					conu	nucu				

					LIENT	LOG	OF BOR	NG NU	MBER	MW-2	:05		
A =		N	•		Atlantic Richfield Company								
AΞ	C	JIV	1	Р	ROJECT NAME	ARCH	IITECT-E	NGINE	ER				
				F	Rico - Argentine Mine Site	And	lerson	Eng	ineering	g Com	pany, I	lnc.	
SITE LO	CATI	ON				-			-O-UNCC	NFINED	COMPRESS 3	SIVE STR	RENGT
Rice	o-A	rger	ntir	1e					1 1	/F1 2	3	4	5
									'	-		1	1
Œ			SE						PLASTIC LIMIT %		WATER ONTENT %		UID IT %
(F. 0		ш	IAN		DESCRIPTION OF MATERIAL			ے ا				— — —	
TH(F	8	🗄	DIS	ż∣	BESON HON OF WINTERINE			≥	10	20	30 4	40 5	50
DEPTH(FT) ELEVATION(FT)	무	빌	빌					Ŗ. F.	-	HATS.	NDARD		
	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	SURFACE ELEVATION Feet	(Con	ntinued)	UNIT DRY WT. LBS./FT.³	⊗	PEN	ETRATION	BLOWS	
	0)	0)	0) [<u>r</u>	Alluvium/Colluvium Mix - 15% cobble, 45% grav		Tillueu)		10	20	30 4	40 5	50 T
				Ц	25% sand, 15% fines - 7.5 YR 4/4	CI,							
				•									
				•	~								
					Become 7.5 YR								
				ſ									
				ľ									
65.0			Ш		65.0		2000						
				\prod	Severely weathered halo around dark gray limes	stone							
	12A	SON		П	cobble at 65.0 feet								
	`	- '	$ \downarrow $	Ц	/\								
	12B SON	H	67.5 Alluvium - 0% cobble, 60% gravel, 40% sand, 5	0/_				+	+-				
		Ц	68.5 fines - 5 YR 4/6	/0							L		
			8.0-inch thick fine sand	/									
70 O			70.0										
70.0		Τť	Alluvium - 0% cobble, 5% gravel, 90% sand, 5%	, 0					+				
		11	fines - 5 YR 4/4										
				П	• • •		16526						
	12	SON		H	<u>: • : • </u>		和名						
	13	SON		╟	•••								
				H	•••								
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75.0			4	-	* * 75.0	00/	1999				+		<u> </u>
	1				Alluvium - 1% cobble, 10% gravel, 79% sand, 1	0%							
	14	SON			• • • • • • • • • • • • • • • • • • •								
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				11	Alluvium - 0% cobble, 30% gravel, 65% sand, 5	%							
					50 0 1 tines - 5 YR 4/4								
)E ()													
5.0													
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10.0		1999		 ↓_	 _		<u> </u>	<u> </u>					
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he strati	ificatio	on lines	s rep	res	ent the approximate boundary lines between soil types: in situ, the transition	on may be	e gradual.	AEC	OM JOB NO. 602 :	39818	SHEET NO	O. 3	OF
											1	-	

				С	LIENT	LOG	OF BOR	NG NL	IMBER	MW-	-205		
A =		24	•	1	Atlantic Richfield Company								
AΞ	C	JIV	1	Р	ROJECT NAME		HITECT-E						
				F	Rico - Argentine Mine Site	And	derson	Eng	ineerir	ng Cor	mpany,	Inc.	
SITE LO	CATI	ON							-O-UNG	CONFINE	COMPRES 3	SIVE STR	RENGTI
Ric	o-A	rger	ntir	ne					TON	IS/FT. ²	3	4	5
		Ŭ										-	+
Ê			핑						PLAS1		WATER		UID
(F		ا سا	AN V		DESCRIPTION OF MATERIAL				LIMIT	% C	CONTENT %	LIM — — —	IT % △
H, H, T, A, T,	ò.	₹	ISIC	≽l	DESCRIPTION OF WATERIAL			M. M.	10	20	30		50
DEPTH(FT) ELEVATION(FT)	Ē	<u> </u>						PRY FT.³	10			+0 0	+
	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY				UNIT DRY WT. LBS./FT.³	$ \otimes$		ANDARD NETRATION	BLOWS/	(FT)
	Ś	Ś	Ŝ		SURFACE ELEVATION Feet		ntinued)	5 5	10	20	30		<u>50</u>
	1			11	Alluvium - 0% cobble, 30% gravel, 65% sand, 5 fines - 5 YR 4/4	%							
]			П	0000 IIIIes - 5 TR 4/4								
	4-			H	0 0 0								
	15	SON		П,									
				Ш									
				П			16536						
95.0	-			П	0000		1665G						
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100.0	1												
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	1												
			Ш	Η,	00000102.0		19939						
	1			$\ \cdot\ $	Alluvium - 5% gravel, 90% sand, 5% fines - 5 Y	R 4/2	15535						
				H			166546						
				$\ \cdot\ $	···								
105.0	-				·:·:								
100.0	t			П	• •								
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	-			H									
				$\ \cdot\ $	···		16536						
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	16	SON			• [•]								
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110.0]												
	1			$\ \cdot\ $	Scattered angular dark gray limestone gravel								
	1				•[•]								
				$\ \ $	Scattered gravels								
	1		∐⊦	4	•••								
	1			-	Scattered angular dark gray limestone gravels								
				ł									
115.0	1			1	115.0								
1 13.0			+	\dashv	2.0-inch gravels - color becomes mix of 16 17				 		$\overline{}$	+	
					2.0 mon gravois - color becomes mix or 10 17								
	-				117.0		16696						
			$\forall t$	Ц	Colluvium - 0% cobble, 30% gravel, 60% sand,	10%	IN SER		 			+	
					fines - 5 YR 3/2	•							
	-				네이어								
	4-			H									
120.0	17	SON		L				L	1	L		<u> </u>	<u> </u>
					continued	d							
												<u> </u>	<u> </u>
The strat	ificatio	on lines	s rep	res	ent the approximate boundary lines between soil types: in situ, the transition	on may b	oe gradual.	AEC	OM JOB NO 60). 239818	SHEET N	10. 4	OF (
												-	

					LIENT	LOG	OF BOR	NG NU	IMBER	MW-20)5						
Λ=		1	•		Atlantic Richfield Company												
AΞ	C	JIY	1	PI	ROJECT NAME	1		ENGINEER									
				F	Rico - Argentine Mine Site	And	derson	Eng	ineering	Comp	oany, I	nc.					
SITE LO	CATI	ON				-			-O-UNCO	NFINED C	OMPRESS	IVE STR	ENGTH				
Ric	o-A	rgei	ntir	ne					TONS/	FT. ² 2	3 4	4 5	5				
									<u> </u>	-	-	-					
Ê			핑						PLASTIC		ATER	LIQ					
F. O		ш	Ā		DESCRIPTION OF MATERIAL				LIMIT %		ITENT %	LIMI — — —					
H. F. E.	Š.	ĭ₹	SIG	<u></u>	DESCRIPTION OF WATERIAL			×	10	20		0 5					
DEPTH(FT) ELEVATION(FT)	빌	쁘	빌					PR FT.°		STANI	-	-					
	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	KECOVERY	SURFACE ELEVATION Feet	(0-	ntinued)	UNIT DRY WT. LBS./FT.³	⊗	PENE.	TRATION I	BLOWS/((FT)				
	S	S	S	<u> </u>	SURFACE ELEVATION Feet Colluvium - 0% cobble, 30% gravel, 60% sand,			ם כ	10	20	30 4	0 5	0				
	1		∐⊦	4	fines - 5 YR 3/2	1070	16596										
				:													
			_	1	Weethered boulders 2 CLEV 5/4 palestroops as	- d	1993				+-						
	1			1	Weathered boulders 2 GLEY 5/1, calcareous sa stone and siltstone from 122.0 to 127.0 feet	na							ĺ				
	-			- \									ĺ				
	1												ĺ				
125.0					\												
-	1				\								ı				
													ı				
													ı				
	1				0.25 to 2.0 inch alluvial gravels, various sources								l				
					subangular to subrounded	,							l				
	-												ĺ				
130.0	1												ĺ				
	1																
	1				Weathered boulders 2 GLEY 5/1, calcareous sa	nd	1982										
]				stone and siltstone												
	1			- 1/			100315										
	1			V			16696						ĺ				
			+		134.0												
135.0	1				Alluvium/Talus - 5% cobble, 55% gravel, 35% sa 5% fines - 1 GLEY 3/1	ana,							ĺ				
	1			P	Well-rounded red sandstone cobble and severly												
	-			•	weatehred grey limestone cobbles in soil matrix												
	1				•								ĺ				
	-			[ĺ				
	1												ĺ				
5													ĺ				
140.0	-												l				
170.0	1				6.								l				
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	1				6.]												
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145.0	1			•	7.												
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	1			•	79								l				
3																	
150.0	-		4	-[150.0		MASO		 	+-	+						
					continued	I											
140.0 145.0 The strat																	
<u> </u>																	
The strat	ificatio	n line	s ren	res	ent the approximate boundary lines between soil types: in situ, the transitio	n may h	ne gradual	AEC	OM JOB NO. 6023	-	SHEET NO	D (DF _				
inc suat	σαιι		o ich		on the approximate boundary into between soil types. In situ, the transitio	ay L	o gradual.		6023	9818		໌ 5	<u>6</u>				

					1	LIENT		LOG OF I	BORI	NG NUI	MBER	MW-205						
	AΞ	c	24	1		Atlantic Richfield Cor	mpany	ADOLUTE	OT F	NONE								
'		•		•		Rico - Argentine Mine	Site	ARCHITE			⊧ਲ ineerin(n Co	omna	nv I	nc			
S	ITE LO	CATI	ON		•	Nico - Ai gentine mine	, Oite	Allaci	3011	Liigi	-O-UNCO	ONFIN	ED COM	IPRESS	SIVE ST	RENGTH		
	Ric			ntiı	ne	•					TONS	S/FT. ²	3		4	5		
F	DEFIN(F1)		ш	SAMPLE DISTANCE		DESC	DIDTION OF MATERIAL				PLASTIC		WAT CONTE	NT %	LIN	QUID //IT %		
DEPTH/ET	YAT!	O	SAMPLE TYPE	DIST	≿	DESCI	RIPTION OF MATERIAL			UNIT DRY WT. LBS./FT.³	10	20				50		
٢		SAMPLE NO.	MPLE	MPLE						IT DR.			TANDA					
	\leq	SAI	SAI	SAI	W.		eet	(Continu	ıed)	E E	⊗ 10	20 20	PENETRA 30	ATION) 4	BLOWS 10	5/(FT) 50		
						End of Boring												
60239818 RICO-UPDATED 10-11-13.GPJ FS_DATATEMPLATE.GDT 10/15/13 																		
18 RIC			<u> </u>	<u> </u>														
23981			The	strat	tific	cation lines represent the app	proximate boundary lines between	en soil type:				n ma	ay be g	radual				
	ORTHIN	G					BORING STARTED		AEC	OM OFF	ICE I	Denv	er					
Ŏ E	ASTING						BORING COMPLETED		ENT	ERED BY	Y H	SHEE	ET NO.	0F	6			
AECOM LOG	'L						RIG/FOREMAN Boart/Longyear Sonic 300/Ri	ck Mallet	APP'			AECC	OM JOB					

2. Test Pits

TP-2004A

TP-2004B

TP2011-AT1

TP2011-AT2

TP2011-AT3

TP2011-AT4

TP2011-AT5

TP2011-AT6

TP-17

TP-18

TP-22

TP-2013XX

TP-2013YY

TP-2013ZZ

	ANDE	¢				BORING LOG		PAGE OF
OGG CHEC ORILL	ED BY	ON	Not		HOLE	BORING NUMBER: TP-/7 SURFACE ELEVATION: TER: USED:	COORDINATE OR LOCATION GWL DEPTH GWL DEPTH DATE STARTE	(STATIC)
ASIN	IG TYP	E AND	SIZE		M		A.G.S TO _ TO _	
DEPTH ()	SAMPLE TYPE AND NUMBER	SAMPLE DEPTH INTERVAL	BLCWCOUNT	RECOVERY LENGTH	PROFILE	DESCRIPTION		WELL CONSTRUCTION SUMMARY
5,50,50,50,50,50	9.0	X				polt with some aboy gravel with pole Pock content 25% or very Content 25% organic material, Brown selly clay come large rock in 5% soil moist	(2" to 1st	noch sail ancist
						1		
					9			
	TD=_		1)	10	of Pot	Back filled & J Sample Collect	Compo ed, Cor	uposit 3 Maderial

19-17

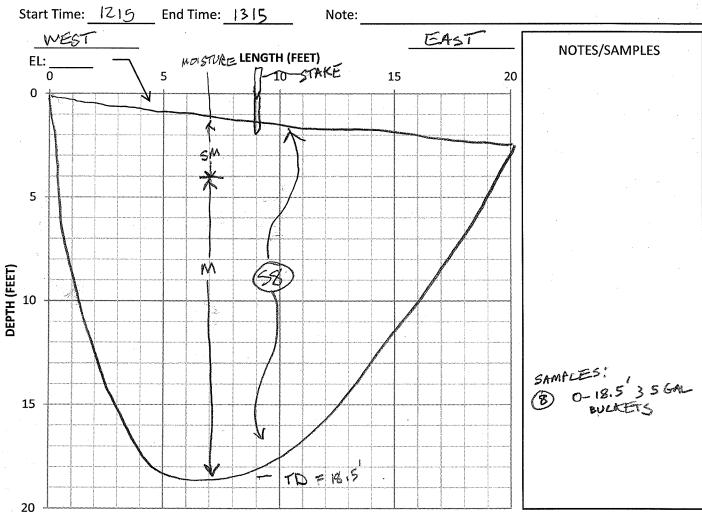
. Sa.

			ico (Lou	SPE	ends	BORING NUMBER: TP-18	COORDINAT OR LOCATIO	N:
CHEC	ED BY: KED BY	(:		*		SURFACE ELEVATION:	GWL DEPTH	
DRILL	ING B	rest	Pi	+	HOLE DIAME	TER A FLUID NA	THE RESERVE OF THE PERSON OF T	ED: 10-14-03 LETED: 10-14-08
CASIN	IG TYP	E AND	SIZE:	weeking.		NA FROM_	A.G.S TO	
SCRE	ENTTE	EAND	SIZ.E.			NT PROW_		0.0.0.
DEPTH ()	SAMPLE TYPE AND NUMBER	SAMPLE DEPTH INTERVAL	BLOW COUNT	RECOVERY LENGTH	PROFILE	DESCRIPTION		WELL CONSTRUCTION SUMMAR
0.5 1.5 2.0 2.5 3.0 3.5 4.3 4.5 5.0 5.5						Brown clayer 5.10 wing gravel and Cobble (3" - >12" @)	th 10% rock	
5.5								
1.4						-	-	
				4000				
	TD=	7	٥			NOTES		././
				1)	10	st Pit Backfilled imple collected, (d Compo	Cred

9	ANDER					BORING LOG	PAGE _/_ OF _/_					
ROJE OGGE HECK	D BY: ED BY		1CS	Por		T. L. STEERSTON	ON: (ENCOUNTERED) (STATIC)					
		ack			DIAM	TER: USED: N DATE COMP	TED: 10-13-08 LETED: 10-13-08					
		E AND		٨	IA	FROMA.G.S TO	B.G.S. N.A					
DEPTH()	SAMPLE TYPE AND NUMBER	SAMPLE DEPTH INTERVAL	BLOWCOUNT	RECOVERY LENGTH (%)	PROFILE .	DESCRIPTION	WELL CONSTRUCTION SUMMARY					
3.5	220	XX				Crushed stone and solidified Red Sandy tailings - calvine Orange 51th Sand with gravel of cottles - Mine waste Brown 517 by sand a with gravel and cottles						
4. 7. 5. 4. 1. 4. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	5.0					TO 1	Large rocks, could not remove - refuse No water encounte					

.

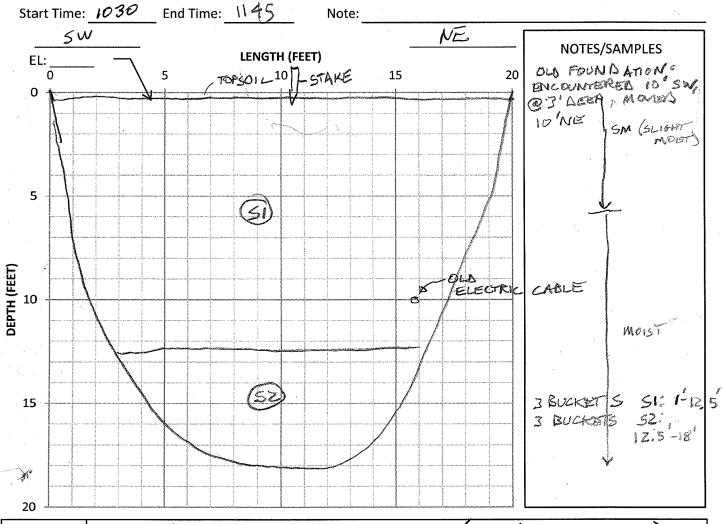
TEST PIT #
TP 2013 -6
V-1010

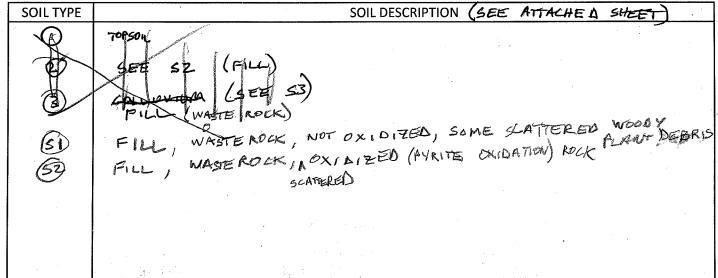


SOIL TYPE	S	OIL DESCRIPTION	
① (\$8)	COLLUVIUM		91.
			e para para di sebagai di Sebagai Sebagai di Sebagai di S

	TEST PIT LOG		TEST PIT #
	Rico St. Louis Ponds DATE:	23 OCT 13	
NO	LOGGED BY: A	/C1	TP 2013-7
WEATHER	60°F CLEAR EXCAVATION METHOD: &	ONATSU P	C300LC_
LOCATION	STA 0+50 ON ST. LOUS FUNEL COLLAPSI	ED ABIT	ACLES
Start Time	133 End Time: 1430 Note:		
	MOISTURE	NOTES	/SAMPLES
EL:			a majorit acception to the
0.	77	NO PLA	PILE MATL
		LIMIT	i aspin
	59 SM SOUD TO MATERIAL	10 7.0	FEET
5			
***************************************	3 1 - 2 - 1	·	
	TA=17,0		
± 10 +		·	
DEPTH (FEET)			
		and the second s	
		SAMPLES	<i>*</i>
15		(9) 0-7.5	; ' 3 5 GAL BUCKETS
			BUCKERS
- and the state of			
20			
SOIL TYPE	SOIL DESCRIPTION		
(D)			<u> </u>
	FILL WITH OXIBITED WASTE ROCK		
(59)	FILL, WITH OXIBICO WASI		
		× .	•
		•	
,			
·			•

TEST PIT LOG PROJECT: Rico St. Louis Ponds NO: 2013-55R-1 WEATHER: CEGER, 40° EXCAVATION METHOD: FOMATSU PC 300 LOCATION: 150' FAST OF LIME PLANT \$ LOG





VAPIOUS ZOIS TEST PITS

							3	OIL	חבא	CKIF	110	N D	CIAL	L											HOLE:	-50B		sr-1	Mary 2		SHEETOF_
		DESCR	IPTION	1	,						PA	RTICLE	SIZE, C	OMPO	SITION	AND	SHAP	E							CLASS		Field n	nethods to describe plasticity (FHWA, 2002b)		
															*.									,w,		Plasticity Range Adje	ctive	Dry Strength	Sincar Test	Thread Smallest Dinmeter, in (mm)	
																	(chec		⊢	PAR	TICLE S	HAPE		, L=Low,		0 Nonp	lastic w	none - crambles into powder with more pressure low - crambles into powder with	gritty or rough to	ball cracks	
							Visi	1	mate %	6 by dr	y weig	ht (max	part.	ize)		cont	ent)	_т	VIS	UAL (A	AND AS	TM D	2488)	lastic		1 - 10 plast		some finger pressure medium - breaks into pieces or enumbles with considerable finger	smooth and	(6 to 3)	
			S			ਉ		305 mm	76 mm															d-no		>10 - 20 med plast		enumbles with considerable finger pressure high - cannot be broken with	dull	(1.5)	
			(N, W	OURCE	(Fabric)	Max Particle Size (inch)		2") 3(, F		Sand		3	*				70	/W>3)	(T>3)	>3)	(W/T>3)		ss: NP=I H=High		>20 - 40 Big plast		finger pressure; spec, will break into pieces between thumb and a hard surface	Shiny	0.03 (0.75)	·••
¥.			actio	IAL S		rticle	.(12	(3"-1				-		s	gular	gular	ndec	anude	cal (L	(¥)	<u> </u>	N) let		y Fine lium,		>40 very p	dastic	very high - can't be broken between thumb and a hard surface	very shiny and waxy	0.02 (0.5)	
NUMBER	MUNSELL (MO		HCL Re	MATERIAL SOURCE	Structure	Мах Ра	Boulder	Cobble	Grave	Coarse	Medium	Fine	Fines	Organics	Very angular Angular	Sub-Angula	Sub-rounded	Kounded Well Rounded	Cylindrical	Discoidal (W/T>3)	Spriencai Tabular (W/T>3)	Ellipsoidal	rregular	Plasticity Fines: NP=Non-Plastic, M=Medium, H=High	USCS			COMN	1ENTS		
1.	SYR 3	3/2	N	F	STR	32	5	15	Zo	15	15	15	15	0	4		بچ	W PRINCIPLE A LA			Х	7		L	SM	80% 9	, 14	T FINES			
2	10 YR	4/3	W	F	STA	24	5	Z S	25	12	١١	11	10	ס	<						入)	(L	GW-GM	11	1 (71			
	7,5 YP				HOM	36	5	15	25	15	10	10	ι5	0	<		>				×	3	(W	6M-GL	50% SI	LT	FINES			
ŀ	7.540	2/12	W	F	HOM	18	Z	10	33	15	15	15	10	0	€		>	1		9	×	7	<	L	6W-6M	80% S		r fines			
5	7,54	R4/4	W	F	STA	29	5	ZD	30	12	12	114	8	0	- €	-	>				×	Ø	(411	GW-GW	11	, 1				
6		·	******	F	-	36	50	40	2_	Z	2	Z	2	0	, (C	->						7	4	NP	NA			•.			
7	7:541	R 3/3	M	U	-	36	5	25	20	12	12	()	15	0	Æ	-	4		8		×	>	(d)	<u>L</u>	60	50%	S 17	I FINES			
	7,5 41										10	10	15	0	4		>				×		Ž.	M	6W-6C	80% C	LA	y fines		3.00,000	and the second
9	7/5 Y	R3/3	W	F	STA	15	2	25	25	12	12	1 (13	0	<		->				×	_ :	4	NP	6W-6M	90% =	· I Lat	FINES	F 199 1271 179384, F 2 A 199 275 285 285 285 285 285 285 285 285 285 28		
0	TALLES OF THE COMMENT AND DRIVE ASSESSMENT	~~~													12				1						40a-55 49						
1															33																
2				1175-1751 10000 and a																e e		TOTAL CONTRACTOR OF THE PARTY O		. 2	A TO						
3						4								12.32										i I				· · · · · · · · · · · · · · · · · · ·	· .		
4																															
5					-																				-		NA POOR NOW THE				
۱6					-												T								1/2	w.					**

MATERIAL SOURCES F=Fill A=Alluvium AF=Alluvial Fan E=Eolian L=Landslide C=Colluvium WB=Weath Bedrk U = Unknown

STRUCTURE (ASTM D2488) STR=Stratified (Layers >6mm) LAM=Laminated FIS=Fissured SLK=Slickenside BLK=Blocky LEN=Lensed HOM=Homogeneous





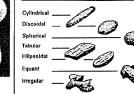














n of Inorganic F Manual Tests

Scii Symbol	Dry Strength	Dilatancy	Toughness and Plassony
ML	Nane to law	Slow to rapid	Low or thread cannot be formed
CŁ	Medium to high	None to slow	Medium
MH	Low to medium	None to slow	Low to medium
C∺	High to very high	None	High

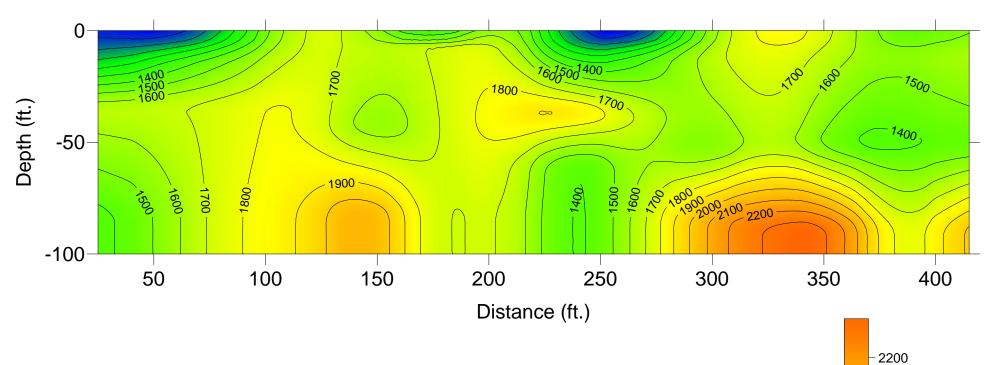
3. Surface Geophysical Surveys

Refraction Microtremor

RM-201 RM-202

RM-202 RM-203 RM-204 RM-205A RM-205B

RM-205C



2000

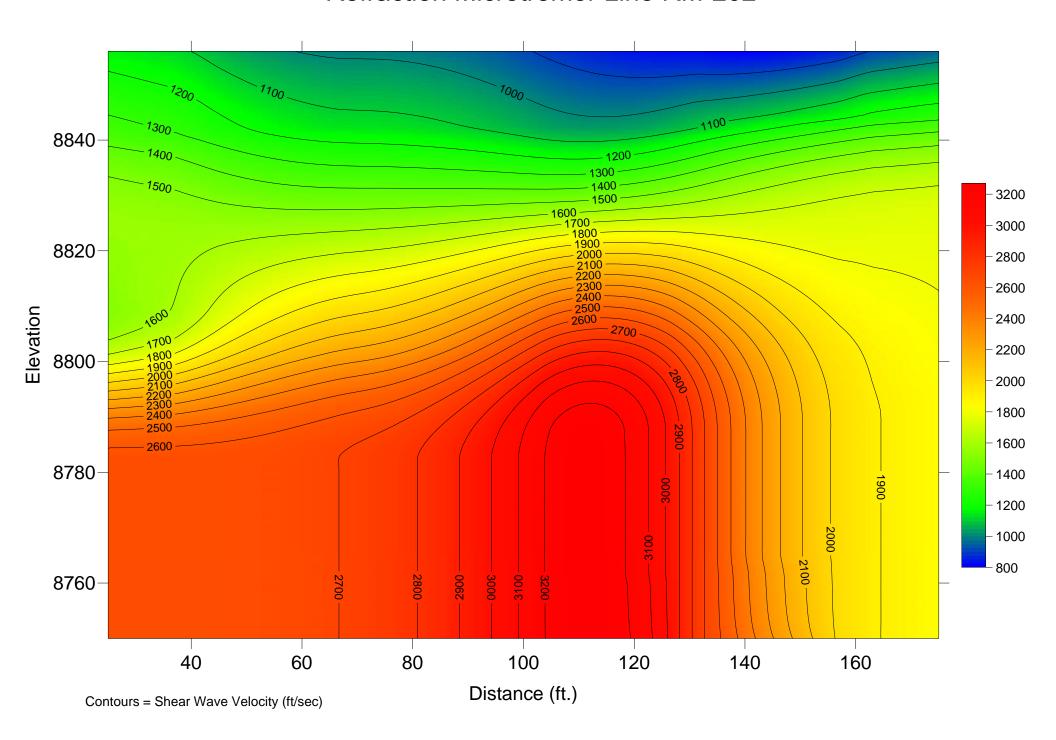
1800

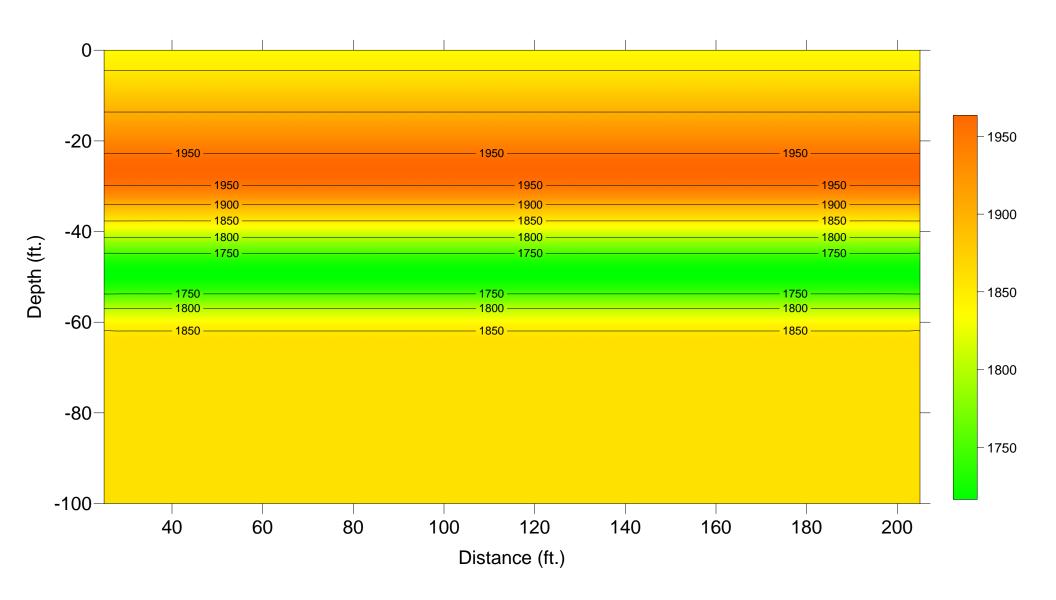
- 1600

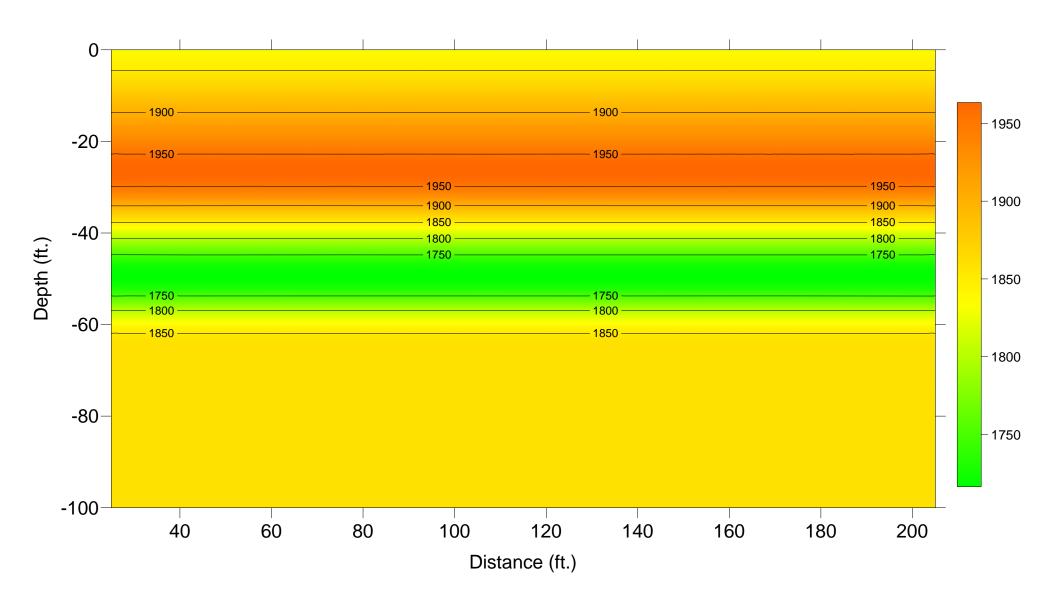
- 1400

- 1200

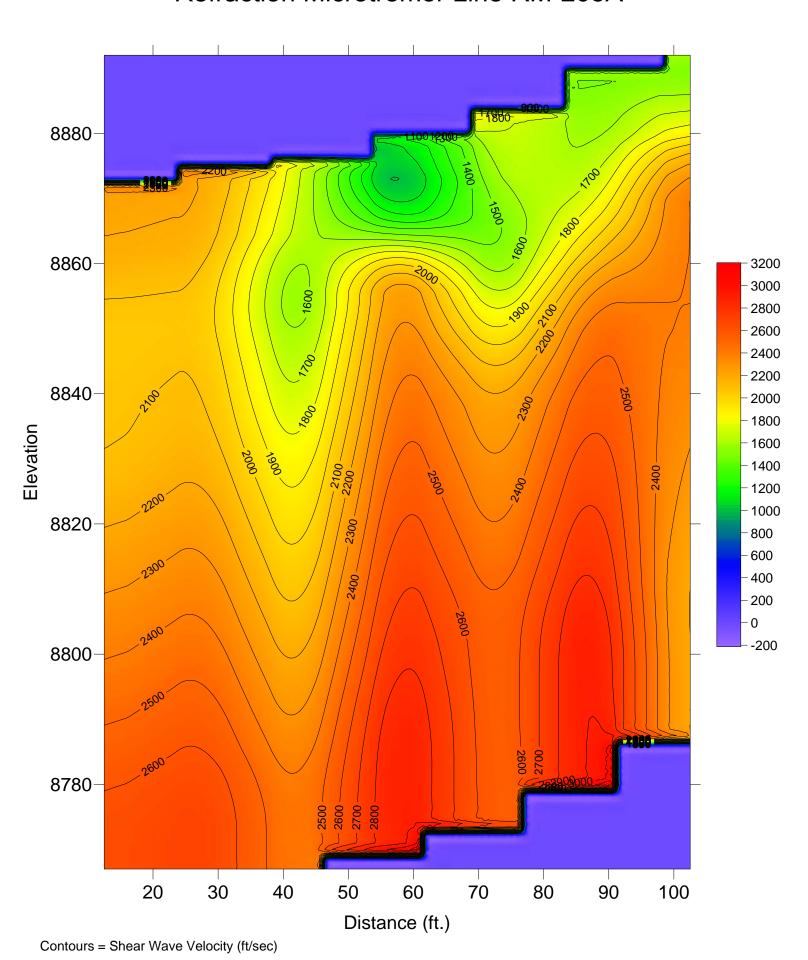
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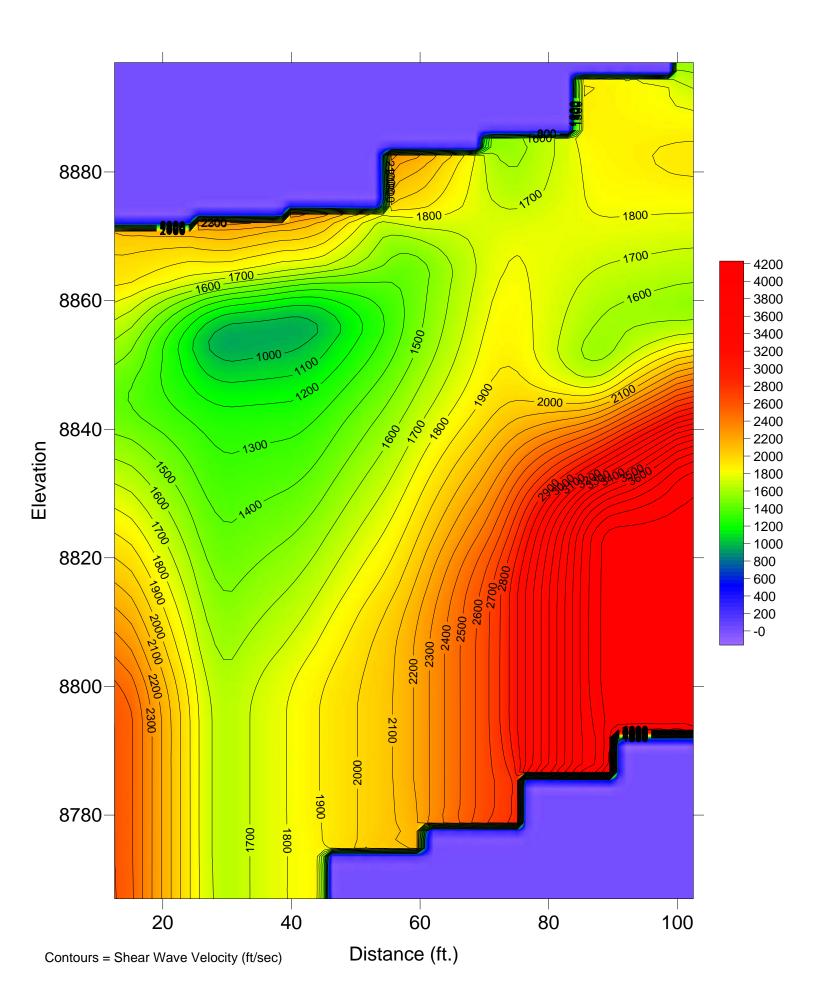




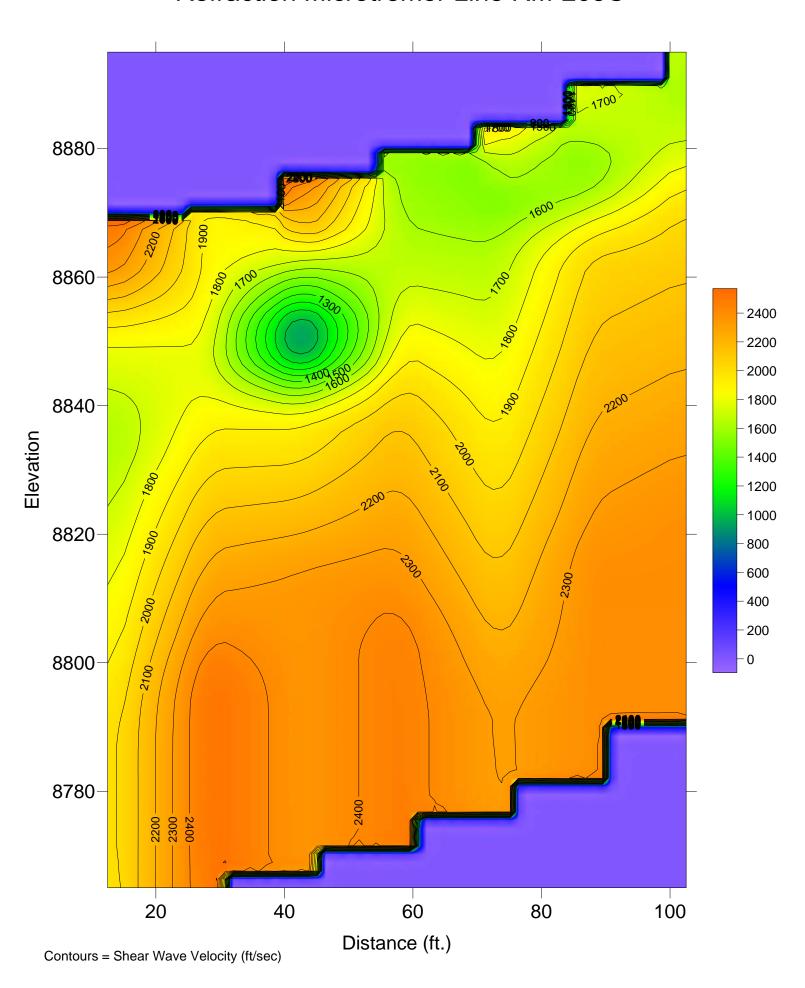
Refraction Microtremor Line RM-205A



Refraction Microtremor Line RM-205B



Refraction Microtremor Line RM-205C



Appendix B: Geotechnical Testing

Soils Testing

- 1. Samples from Borings
- 2. Samples from Test Pits

Soils Testing

1. Samples from Borings

AT-2

BAH-01

CHV-101D

CHV-101S

EW-1

EW-2A

MW-201

MW-202

MW-203

MW-204

MW-205

MW-206

MW-207

SSR-103 St. LOUIS ADIT



LABORATORY REPORT

Date of Report 12-13-12

Job No. 3151JM098

Event / Invoice No. 31520185-25

Lab No.

Authorized By C. SANCHEZ

Date 10-22-12

Sampled By CLIENT
Submitted By J. GISSEMAN

Date 11-02-12 Date 11-14-12

Project RICO INITIAL SOLIDS REMOVAL & DRYING

Client ANDERSON ENGINEERING COMPANY, INC.

Contractor FLARE CONSTRUCTION

977 WEST 2100 SOUTH

SALT LAKE CITY, UT 84119

Type / Use of Material VARIOUS

Sample Source / Location CHV-101S

Reference: ASTM
Special Instructions:

Location RICO, COLORADO

Arch. / Engr. ANDERSON ENGINEERING

Supplier / Source BORINGS

Source / Location Desig. By CLIENT

Date 10-27-12

TEST RESULTS

ELEVATION (FT)	MOISTURE CONTENT (%)	ATTERBERGS:	LL	PL	PI	ORGANIC CONTENT (%)
2.5-4'	12.5					
5-6.5'	11.9					
7.5-9'	7.9					
10-11.5'	8.8					
12.5-14'	14.9		NV	NV	NP	
15-16.5'	14.8					
17.5-19′	12.0		NV	NV	NP	
20-21.5'	12.9					
22.5-23.5'	15.9		NV	NV	NP	
27.5-29'	9.8					
30-31.5'	11.8					
45-46.5'	10.3					

Comments: SEE ADDITIONAL PHYSICAL PROPERTIES REPORTS FOR GRADATIONS

Copies To: CLIENT (2)

THE SERVICES REFERRED TO HEREIN WERE PERFORMED IN ACCORDANCE WITH THE STANDARD OF CARE PRACTICED LOCALLY FOR THE REFERENCED METHOD(S) AND RELATE ONLY TO THE CONDITION(S) OR SAMPLE(S) TESTED AS STATED HEREIN. WESTERN TECHNOLOGIES INC. MAKES NO OTHER WARRANTY OR REPRESENTATION, EXPRESSED OR IMPLIED, AND HAS NOT CONFIRMED INFORMATION INCLUDING SOURCE OF MATERIALS SUBMITTED BY OTHERS.

REVIEWED BY

450@95WTI



PHYSICAL PROPERTIES OF AGGREGATES

Client ANDERSON ENGINEERING 977 WEST 2100 SOUTH SALT LAKE CITY, UT 84119 Date of Report 12-13-12 Job No. 3151JM098

Event / Invoice No. 315200185-25

Lab No. 0981118-

Authorized By C. SANCHEZ

Date 10-22-12

Sampled By CLIENT

Date 11-02-12 Date 11-14-12

Submitted By J. GISSEMAN Location RICO, COLORADO

Arch. / Engr. ANDERSON ENGINEERING

Supplier / Source BORINGS

Source / Location Desig. By CLIENT

Date 11-02-12

Project RICO INITIAL SOLIDS
Contractor FLARE CONSTRUCTION
Type / Use of Aggregate VARIABLE
Sample Source / Location CHV-101S 2.5-4'
Special Instructions: 0981118-1

TEST RESULTS

F	V	7	T	PHYSICAL PROPER	TO A STATE OF THE	TECT	T
SIEVE ANALYSIS	ACCUMULATIVE	AASHTO T27		TEST RESULTS	SPECIFICATION		
U.S MM	% PASSING	SPECIFICATION					
4 IN100.0			UNIT WEIGHT 8	VOIDS FINE AGGR	REGATE UNIT WEIGHT, PCF >		
3 - 75.0				AASHTO T19	VOIDS, % →		
2 - 50.0			Commence of the Commence	JIGGING LOOSE COARSE A			
1 1/2 - 37.5			Linobbiito	_ JIGGING _ EGGGE GOANGE A	Voids, % →		
1 1/4 - 31.5					VOIDS, 10 P		
1 - 25.0				FINE AGGREGATE	BULK SPECIFIC GRAVITY →		
3/4 - 19.0	100			ASTM C128 AASHTO T84	BULK SPECIFIC GRAVITY (SSD) >		
	100						
1/2 - 12.5	95		SPECIFIC	AGGREGATE DRIED	APPARENT SPECIFIC GRAVITY		
3/8 - 9.5	86		GRAVITY	YES NO	ABSORPTION, % →		
1/4 - 6.3	81		&		_		
NO. 4 - 4.75	76		ABSORPTION	COARSE AGGREGATE	BULK SPECIFIC GRAVITY >		
8 - 2.36	67			ASTM C127 AASHTO T85	BULK SPECIFIC GRAVITY (SSD) >		
10 - 2.00	65			AGGREGATE DRIED	APPARENT SPECIFIC GRAVITY		
16 - 1.18	60			LYES NO	ABSORPTION, % →		
30600	52						
40425	49		SAND EQUIVAL	ENT VALUE ASTM D2419	AASHTO T176 % →		
50300	45						
100150	36			SMALL COARSE AGGREGATE	100 REV., % LOSS →		
INER THAN NO. 200	0		RESISTANCE	ASTM C131 AASHTO T96	GRADING 500 REV., % LOSS →		
X ASTM C117	29.6		то				
AASHTO T11			DEGRADATION	LARGE COARSE AGGREGATE	200 REV., % LOSS →		
				ASTM C535 GRADING	1000 REV., % LOSS →		
FINENESS MODULU	S. ASTM C125 -						-
			LIGHTWEIGHT I	PIECES	FINE AGGREGATE, % ->		
LIQUID & PLASTIC	PROPERTIES		ASTM C123	AASHTO T113	COARSE AGGREGATE, % >		
ASTM D4318		& T90		01100000000000000000000000000000000000	20-20-0 (2012)		
METHOD A	- December of the Parisher of	SPECIFICATION	CLAY LUMPS &	FRIABLE PARTICLES	FINE AGGREGATE, % ->		
LIQUID LIMIT			The state of the s	AASHTO T112	COARSE AGGREGATE, % →		
PLASTIC LIMIT							
PLASTICITY INDEX			FRACTURED FA	CES COARSE AGGREGATE BY WEI	GHT ONE OR MORE FACES, % →		
SAMPLE AIR DRIED	TYES T NO			FLH T507 FAA	TWO OR MORE FACES, % →		
SAMITEL AIN DINED					Tito on mone more, w		
CLEANNESS VALUE	CA227 →		DURABILITY IN	DEX ASTM D3744 AASHTO	T210 D →		
CLEANNESS VALUE	CA221 7			A COARSE B FINE C C			
ORGANIC IMPURITIE	ER ASTM CAO	DAASHTO T21			Di 7		
SCHOOL STATE OF THE SCHOOL				VOID CONTENT ASTM C1252	% →		
ORGANIC PLATE NO	J. 7		UNCONPACTED	ASTINI C1252			
	CORFOATE		FLAT & FLORIO	TED PARTICLES ASTM D4791	BY WEIGHT, % →		
CARBONATES IN AC			and the second	RATIO USED 1:2 1:3 1:5			
ARIZ 238 AS	TM D3042 % -		DIMENSIONAL	MIIO 0320 1:2 1:3 1:5	BY NUMBER, % 7		1

Comments:

Copies To: CLIENT (2) - ELECTRONIC

THE SERVICES REFERRED TO HEREIN WERE PERFORMED IN ACCORDANCE WITH THE STANDARD OF CARE PRACTICED LOCALLY FOR THE REFERENCED METHOD(S) AND RELATE ONLY TO THE CONDITION(S) OR SAMPLE(S) TESTED AS STATED HEREIN. WESTERN TECHNOLOGIES INC. MAKES NO OTHER WARRANTY OR REPRESENTATION, EXPRESSED OR IMPLIED, AND HAS NOT CONFUNED INFORMATION INCLUDING SOURCE OF MATERIALS SUPPLIED BY OTHERS.

REVIEWED BY



PHYSICAL PROPERTIES OF AGGREGATES

Client ANDERSON ENGINEERING 977 WEST 2100 SOUTH SALT LAKE CITY, UT 84119 Date of Report 12-13-12

Job No. 3151JM098

Event / Invoice No. 315200185-25

Lab No. 0981118-

Authorized By C. SANCHEZ

Date 10-22-12

Sampled By CLIENT

Date 11-02-12

Submitted By J. GISSEMAN

Date 11-14-12

Project RICO INITIAL SOLIDS

Contractor FLARE CONSTRUCTION

Type / Use of Aggregate VARIABLE

Sample Source / Location CHV-101S 12.5-14'

Special Instructions: 0981118-5

Location RICO, COLORADO
Arch. / Engr. ANDERSON ENGINEERING

Supplier / Source BORINGS
Source / Location Desig. By CLIENT

Date 11-02-12

TEST RESULTS

				TEST RESOLTS		TEAT	T
SIEVE ANALYSIS	X ASTM C136	AASHTO T27		PHYSICAL PROPER	TIES	TEST RESULTS	SPECIFICATION
SIEVE SIZE U.S. – MM	ACCUMULATIVE % PASSING	SPECIFICATION					
4 IN100.0			UNIT WEIGHT 8	VOIDS FINE AGGR	EGATE UNIT WEIGHT, PCF →		
3 - 75.0			ASTM C29	AASHTO T19	VOIDS, % →		
2 - 50.0			RODDING	JIGGING LOOSE COARSE AG	GGREGATE UNIT WEIGHT, PCF -		
1 1/2 - 37.5			And the second s		VOIDS, % →		
1 1/4 - 31.5					T		+
1 - 25.0	100			FINE AGGREGATE	BULK SPECIFIC GRAVITY →		
3/4 - 19.0	94		٥	ASTM C128 AASHTO T84	BULK SPECIFIC GRAVITY (SSD) -		
1/2 - 12.5	84			AGGREGATE DRIED	APPARENT SPECIFIC GRAVITY -		
3/8 - 9.5	78		SPECIFIC	YES NO	ABSORPTION, % →		
1/4 - 6.3	66		GRAVITY &				+
NO. 4 - 4.75	60		ABSORPTION	COARSE AGGREGATE	BULK SPECIFIC GRAVITY -		
8 - 2.36	50			ASTM C127 AASHTO T85	BULK SPECIFIC GRAVITY (SSD) -		
10 - 2.00	47			AGGREGATE DRIED	APPARENT SPECIFIC GRAVITY -		
16 - 1.18	42			YES NO	ABSORPTION, % →		
30600	35						1
40425	33		SAND EQUIVAL	ENT VALUE ASTM D2419	AASHTO T176 % →		
50300	29						
100150	23			SMALL COARSE AGGREGATE	100 REV., % LOSS →		
FINER THAN NO. 20	0		RESISTANCE	ASTM C131 AASHTO T96	GRADING 500 REV., % LOSS →		
X ASTM C117	17.4		TO				1
AASHTO T11			DEGRADATION	LARGE COARSE AGGREGATE	200 REV., % LOSS →		i de la companya de l
		L		ASTM C535 GRADING	1000 REV., % LOSS →		
FINENESS MODULU	S, ASTM C125 -	•					-
			LIGHTWEIGHT F	PIECES	FINE AGGREGATE, % ->		
LIQUID & PLASTIC	PROPERTIES		ASTM C123	AASHTO T113	COARSE AGGREGATE, % >		
ASTM D4318	AASHTO T89 8	3 T90					
METHOD A	B RESULT	SPECIFICATION	Caraller or or Participated Control Control	FRIABLE PARTICLES	FINE AGGREGATE, % →		
LIQUID LIMIT			ASTM C142	AASHTO T112	COARSE AGGREGATE, % >		
PLASTIC LIMIT							
PLASTICITY INDEX			FRACTURED FA		GHT ONE OR MORE FACES, % →		
SAMPLE AIR DRIED	YES NO		ASTM D582	FLH T507 FAA	TWO OR MORE FACES, % ->		
							1
CLEANNESS VALUE	CA227 →	•		DEX ASTM D3744 AASHTO	eval all them as a supposed		
				A COARSE B FINE C C	DARSE & FINE Df →		
ORGANIC IMPURITI					7		
ORGANIC PLATE NO	o. •	•	UNCOMPACTED	VOID CONTENT ASTM C1252	% →		
					7		
CARBONATES IN A				ATED PARTICLES ASTM D4791			
ARIZ 238 AS	STM D3042 % →		DIMENSIONAL	RATIO USED 1:2 1:3 1:5	BY NUMBER, % →		

Comments:

Copies To: CLIENT (2) - ELECTRONIC

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REVIEWED BY



PHYSICAL PROPERTIES **OF AGGREGATES**

Client ANDERSON ENGINEERING **977 WEST 2100 SOUTH** SALT LAKE CITY, UT 84119 Date of Report 12-13-12 Job No. 3151JM098

Event / Invoice No. 315200185-25

Lab No. 0981118-

Authorized By C. SANCHEZ

Submitted By J. GISSEMAN

Date 10-22-12

Sampled By CLIENT

Date 11-02-12 Date 11-14-12

Project RICO INITIAL SOLIDS Contractor FLARE CONSTRUCTION Type / Use of Aggregate VARIABLE Sample Source / Location CHV-101S 7.5-9'

Arch. / Engr. ANDERSON ENGINEERING

Supplier / Source BORINGS

Location RICO, COLORADO

Source / Location Desig. By CLIENT

Date 11-02-12

Special Instructions: 0981118-3

TEST RESULTS

		TEST RESULTS				
SIEVE ANALYSIS X ASTM C136 AASHTO		PHYSICAL PROPERTIES				
SIEVE SIZE ACCUMULATIVE SPECIFICAT	ION			RESULTS	1	
4 IN100.0 3 - 75.0 2 - 50.0 1 1/2 - 37.5	UNIT WEIGHT 8 ASTM C29 RODDING	A VOIDS FINE AGGR AASHTO T19 JIGGING LOOSE COARSE AG	VOIDS, % →			
1 1/4 - 31.5 1 - 25.0 3/4 - 19.0 1/2 - 12.5 3/8 - 9.5	SPECIFIC GRAVITY	FINE AGGREGATE ASTM C128 AASHTO T84 AGGREGATE DRIED YES NO	BULK SPECIFIC GRAVITY → BULK SPECIFIC GRAVITY (SSD) → APPARENT SPECIFIC GRAVITY → ABSORPTION, % →			
1/4 - 6.3 NO. 4 - 4.75 8 - 2.36 10 - 2.00 16 - 1.18	& ABSORPTION	COARSE AGGREGATE ASTM C127 AASHTO T85 AGGREGATE DRIED YES NO	BULK SPECIFIC GRAVITY → BULK SPECIFIC GRAVITY (SSD) → APPARENT SPECIFIC GRAVITY → ABSORPTION, % →			
30600 40425 50300	SAND EQUIVAL	ENT VALUE ASTM D2419	AASHTO T176 % →			
100150 FINER THAN NO. 200 X ASTM C117 13.8	RESISTANCE	SMALL COARSE AGGREGATE	100 REV., % LOSS → 500 REV., % LOSS →			
AASHTO T11	DEGRADATION	LARGE COARSE AGGREGATE ASTM C535 GRADING	200 REV., % LOSS → 1000 REV., % LOSS →			
FINENESS MODULUS, ASTM C125 →		LIGHTWEIGHT PIECES FINE AGGREGATE, % →				
LIQUID & PLASTIC PROPERTIES ASTM D4318 AASHTO T89 & T90 METHOD A B RESULT SPECIFICAT LIQUID LIMIT	ION CLAY LUMPS &	CLAY LUMPS & FRIABLE PARTICLES ASTM C142 ☐ AASHTO T112 COARSE AGGREGATE, % → CLAY LUMPS & FRIABLE PARTICLES FINE AGGREGATE, % → COARSE AGGREGATE, % →				
PLASTIC LIMIT PLASTICITY INDEX SAMPLE AIR DRIED YES NO		FRACTURED FACES COARSE AGGREGATE BY WEIGHT ONE OR MORE FACES, % -1 ASTM D5821 FLH T507 FAA TWO OR MORE FACES, % -1				
CLEANNESS VALUE CA227 →		DEX ASTM D3744 AASHTO	L C			
ORGANIC IMPURITIES ☐ ASTM C40 ☐ AASHTO ORGANIC PLATE NO. →	S. 2000					
CARBONATES IN AGGREGATE □ ARIZ 238 □ ASTM D3042 % →		ATED PARTICLES ASTM D4791 RATIO USED 1:2 1:3 1:5				

Comments:

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REVIEWED BY



PHYSICAL PROPERTIES OF AGGREGATES

Client ANDERSON ENGINEERING 977 WEST 2100 SOUTH SALT LAKE CITY, UT 84119 Date of Report 12-13-12

Job No. 3151JM098

Event / Invoice No. 315200185-25

Lab No. 0981118-

Authorized By C. SANCHEZ

Date 10-22-12 Date 11-02-12

Sampled By CLIENT
Submitted By J. GISSEMAN

Date 11-14-12

Project RICO INITIAL SOLIDS

Contractor FLARE CONSTRUCTION

Type / Use of Aggregate VARIABLE

Sample Source / Location CHV-101S 27.5-29'

Arch. / Engr. ANDERSON ENGINEERING

Supplier / Source BORINGS

Location RICO, COLORADO

Source / Location Desig. By CLIENT

Date 11-02-12

Special Instructions: 0981118-10

TEST RESULTS

SIEVE SIZE ACCUMUNITY SPECIFICATION N. PASSING SPECIFICATION N. PASSING	
Silvary Sizvary Sizvary Secification Sizvary	PECIFICATION
4 IN100.0 3 - 75.0 3 - 75.0 3 - 75.0 1/2 - 37.5 1/4 - 31.5 1 - 25.0 3/4 - 19.0	
ASTM C29 AASHTO T19	
1 1/2 - 31.5	
1 1/2 - 37.5 1 1/4 - 31.5 1 1 - 25.0 3/4 - 19.0 1/2 - 12.5 3/8 - 9.5 1/4 - 6.3 NO. 4 - 4.75 8 - 2.36 10 - 2.00 16 - 1.18 30 - 6.00 40 - 4.25 50300 100 - 150 Here than No. 200 Here than No. 200 Here than No. 200 Asstm C117 Asstm C126 Asstm C195 Asstm C117 Asstm C126 Asstm C117 Asstm C126 Asstm C117 Asstm C127 Asstm C195 Asstm C117 Asstm C117 Asstm C117 Asstm C117 Asstm C126 Asstm C117 Asstm C126 Asstm C117 Asstm C126 Asstm C127 Asstm C117 Asstm C127 Asstm C117 Asstm C117 Asstm C127 Asstm C117 Asstm C127 Asstm C117 Asstm C127 Asstm C117 Asstm C128 Bulk specific gravity → Bulk	
1 1/4 - 31.5 1 - 25.0 3/4 - 19.0 1/2 - 12.5 3/8 - 9.5 1/4 - 6.3 NO. 4 - 4.75 8 - 2.36 10 - 2.00 16 - 1.18 30 - 6.00 40425 50 - 3.90 100150 FINER THAN NO. 200 100150 FINER THAN NO. 200 110 - 2.00 110 - 2.00 110 - 2.00 110 - 2.00 110 - 2.00 110 - 2.00 110 - 1.10 FINER THAN NO. 200 110 - 1.10 FINER THAN DA 310 110 FINER THAN DA 310 110 110 110 110 110 110 110 110 110	
3/4 - 19.0 1/2 - 12.5 3/8 - 9.5 1/4 - 6.3 NO. 4 - 4.75	
1/2 - 12.5 3/8 - 9.5 AGREGATE DRIED YES NO	
SPECIFIC YES NO	
1/4 - 6.3 NO. 4 - 4.75 ABSORPTION COARSE AGGREGATE BULK SPECIFIC GRAVITY → BULK SPECIFIC GRAVITY → ABSORPTION	
NO. 4 - 4.75 8 - 2.36 10 - 2.00 10 - 2.00 40425 50300 100150 FINER THAN NO. 200 MARK ASTM C17 AASHTO T11 CARSE AGGREGATE BULK SPECIFIC GRAVITY → BULK SPECIFIC GRAVITY → APPARENT SPECIFIC GRAVITY → APPARENT SPECIFIC GRAVITY → ABSORPTION, % → ABSORPT	
NO. 4 - 4.75 8 - 2.36 10 - 2.00 16 - 1.18 30600 40425 50300 100150 FINER THAN NO. 200 X ASTM C117 ASSH C123 ASSH C131 ASSH C355 ASSH C428	
AGREGATE DRIED APPARENT SPECIFIC GRAVITY ABSORPTION, % ABSORPTION, ABSORPTIO	
SAND EQUIVALENT VALUE	
30600 40425 50300 100150 Mash	
SAND EQUIVALENT VALUE ASTM D2419 AASHTO T176 % > SAND EQUIVALENT VALUE ASTM D2419 AASHTO T176 % > SAND EQUIVALENT VALUE ASTM D2419 AASHTO T176 % > SMALL COARSE AGGREGATE 100 REV., % LOSS > FINER THAN NO. 200 AASHTO T11 14.0 DEGRADATION AASHTO T11 LARGE COARSE AGGREGATE 200 REV., % LOSS > LIGHTWEIGHT PIECES FINE AGGREGATE, % > LIGHTWEIGHT PIECES FINE AGGREGATE, % > LIGUID & PLASTIC PROPERTIES ASTM D4318 AASHTO T99 & T90 METHOD A B RESULT SPECIFICATION PLASTIC LIMIT PLASTIC LIMIT PLASTIC LIMIT PLASTIC LIMIT PLASTICITY INDEX SAMPLE AIR DRIED YES NO CLEAN NESS VALUE CA227 > DURABILITY INDEX ASTM D5821 FLH T507 FAA TWO OR MORE FACES, % > CLEAN NESS VALUE CA227 > DURABILITY INDEX ASTM D3744 AASHTO T210 DC PROCEDURE: A COARSE B FINE C COARSE & FINE D1 PROCEDURE: A COARSE B FINE C COARSE & FINE D1 PROCEDURE: A COARSE B FINE C COARSE & FINE D1 PROCEDURE: A COARSE B FINE C COARSE & FINE D1 PROCEDURE: A COARSE B FINE C COARSE & FINE D1 PROCEDURE: A COARSE B FINE C COARSE & FINE D1 PROCEDURE: A COARSE B FINE C COARSE & FINE D1 PROCEDURE: A COARSE B FINE D1 PROCEDURE: B1 PROCEDURE: B1 PROCEDURE:	
SMALL COARSE AGGREGATE ASTM C117	
SMALL COARSE AGGREGATE 100 REV., % LOSS ASTM C117 14.0	
FINER THAN NO. 200 ASTM C117 AASHTO T11 AASHTO T111 AASHTO T111 AASHTO T111 AASHTO T111 LARGE COARSE AGGREGATE ASTM C535 GRADING 1000 REV., % LOSS > LARGE COARSE AGGREGATE ASTM C535 GRADING 1000 REV., % LOSS > LARGE COARSE AGGREGATE ASTM C535 GRADING 1000 REV., % LOSS > LIGHTWEIGHT PIECES FINE AGGREGATE, % > LIGUID & PLASTIC PROPERTIES ASTM C123 AASHTO T113 COARSE AGGREGATE, % > LIGUID LIMIT PLASTIC LIMIT PROCEDURE: ASTM D5821 FLH T507 FAA ONE OR MORE FACES, % > ASTM D5821 FLH T507 FAA ONE OR MORE FACES, % > CERANNESS VALUE CA227 > DURABILITY INDEX ASTM D3744 AASHTO T210 DC > PROCEDURE: A COARSE B FINE C COARSE & FINE Df > CRGANIC IMPURITIES ASTM C40 AASHTO T21 UNCOMPACTED VOID CONTENT ASTM C1252 ** CARBONATES IN AGGREGATE FLAT & ELONGATED PARTICLES ASTM D4791 BY WEIGHT, % >	
ASTM C117	
DEGRADATION LARGE COARSE AGGREGATE ASTM C535 GRADING LARGE COARSE AGGREGATE ASTM C535 GRADING LOOD REV., % LOSS → LIGHTWEIGHT PIECES ASTM C123 AASHTO T113 COARSE AGGREGATE, % → LIQUID & PLASTIC PROPERTIES ASTM C123 AASHTO T113 COARSE AGGREGATE, % → LIQUID LIMIT PLASTIC LIMIT PRACTURED FACES COARSE AGGREGATE BY WEIGHT ONE OR MORE FACES, % → ASTM D5821 FLH T507 FAA TWO OR MORE FACES, % → PROCEDURE: A COARSE B FINE C COARSE & FINE ORGANIC IMPURITIES ASTM C40 AASHTO T21 ORGANIC PLATE NO. → CARBONATES IN AGGREGATE PLAT & ELONGATED PARTICLES ASTM D4791 BY WEIGHT, % →	
LARGE COARSE AGGREGATE ASTM C535 GRADING 1000 REV., % LOSS → LIGHTWEIGHT PIECES LIGHTWEIGHT PIECES ASTM D4318 AASHTO T89 & T90 METHOD A B RESULT SPECIFICATION METHOD A B RESULT SPECIFICATION LIQUID LIMIT PLASTIC LIMIT PLASTIC LIMIT PLASTIC LIMIT PLASTICITY INDEX SAMPLE AIR DRIED YES NO CLEAN LIGHT SPECIFICATION DURABILITY INDEX ASTM D5821 FLH T507 FAA TWO OR MORE FACES, % → CLEANNESS VALUE CA227 → DURABILITY INDEX ASTM D3744 AASHTO T210 ORGANIC IMPURITIES ASTM C40 AASHTO T21 ORGANIC PLATE NO. → CARBONATES IN AGGREGATE FLAT & ELONGATED PARTICLES ASTM D4791 BY WEIGHT, % → BY WEIGHT, % →	
FINENESS MODULUS, ASTM C125 → LIQUID & PLASTIC PROPERTIES ASTM D4318 AASHTO T89 & T90 METHOD A B RESULT SPECIFICATION CLAY LUMPS & FRIABLE PARTICLES FINE AGGREGATE, % → CLAY LUMPS & FRIABLE PARTICLES FINE AGGREGATE, % → CLAY LUMPS & FRIABLE PARTICLES FINE AGGREGATE, % → CLAY LUMPS & FRIABLE PARTICLES FINE AGGREGATE, % → CLAY LUMPS & FRIABLE PARTICLES FINE AGGREGATE, % → CLAY LUMPS & FRIABLE PARTICLES FINE AGGREGATE, % → COARSE AGGREGATE, % → ASTM C142 AASHTO T112 COARSE AGGREGATE BY WEIGHT ONE OR MORE FACES, % → CLEANNESS VALUE CA227 → DURABILITY INDEX PROCEDURE: A COARSE B FINE C COARSE & FINE D1 → CRGANIC IMPURITIES ASTM C40 AASHTO T21 ORGANIC PLATE NO. → CARBONATES IN AGGREGATE FLAT & ELONGATED PARTICLES ASTM D4791 BY WEIGHT, % →	
LIGHTWEIGHT PIECES LIGHTWEIGHT PIECES ASTM D4318 AASHTO T89 & T90 METHOD A B RESULT SPECIFICATION LIQUID LIMIT PLASTIC LIMIT PLASTIC LIMIT PLASTICITY INDEX SAMPLE AIR DRIED YES NO CLEAN LUMPS & FRIABLE PARTICLES FINE AGGREGATE, % → CLAY LUMPS & FRIABLE PARTICLES FINE AGGREGATE, % → CARST AGGREGATE, % → FRACTURED FACES COARSE AGGREGATE BY WEIGHT ONE OR MORE FACES, % → CLEANNESS VALUE CA227 → DURABILITY INDEX ASTM D3744 AASHTO T210 ORGANIC IMPURITIES ASTM C40 AASHTO T21 ORGANIC PLATE NO. → UNCOMPACTED VOID CONTENT ASTM C1252 SY WEIGHT, % → CARBONATES IN AGGREGATE FINE AGGREGATE, % → COARSE AGGREGATE, % → FRACTURED FACES COARSE AGGREGATE BY WEIGHT ONE OR MORE FACES, % → TWO OR MORE FACES, % → UNCOMPACTED VOID CONTENT ASTM C1252 SY → CARBONATES IN AGGREGATE FLAT & ELONGATED PARTICLES ASTM D4791 BY WEIGHT, % →	
LIQUID & PLASTIC PROPERTIES ASTM D4318 AASHTO T89 & T90 METHOD A B RESULT SPECIFICATION LIQUID LIMIT PLASTIC LIMIT PLASTICITY INDEX SAMPLE AIR DRIED YES NO CLEAN LIQUID END A STM D5821 FLH T507 FAA TWO OR MORE FACES, % > CLEANNESS VALUE CA227 > DURABILITY INDEX ASTM D3744 AASHTO T210 ORGANIC IMPURITIES ASTM C40 AASHTO T21 ORGANIC PLATE NO. > CARBONATES IN AGGREGATE UNCOMPACTED VOID CONTENT ASTM D4791 BY WEIGHT, % > CARBONATES IN AGGREGATE BY WEIGHT, % > CARST ASTM C123 AASHTO T113 COARSE AGGREGATE, % > FINE AGGREGATE, % > COARSE AGGREGATE, % > CARST D478 ASTM C142 AASHTO T112 COARSE AGGREGATE, % > FINE AGGREGATE, % > FRACTURED FACES COARSE AGGREGATE BY WEIGHT ONE OR MORE FACES, % > COARSE AGGREGATE, % >	
ASTM D4318 AASHTO T89 & T90 METHOD AB RESULT SPECIFICATION CLAY LUMPS & FRIABLE PARTICLES FINE AGGREGATE, % → LIQUID LIMIT PLASTIC LIMIT PLASTICITY INDEX SAMPLE AIR DRIED YES NO CLAY LUMPS & FRIABLE PARTICLES FINE AGGREGATE, % → FRACTURED FACES COARSE AGGREGATE BY WEIGHT ONE OR MORE FACES, % → ASTM D5821 FLH T507 FAA TWO OR MORE FACES, % → CLEANNESS VALUE CA227 → DURABILITY INDEX ASTM D3744 AASHTO T210 PROCEDURE: A COARSE B FINE C COARSE & FINE DIFFERENCE OF THE COARSE & FINE CARBONATES IN AGGREGATE FLAT & ELONGATED PARTICLES ASTM D4791 BY WEIGHT, % →	
METHOD A B RESULT SPECIFICATION CLAY LUMPS & FRIABLE PARTICLES FINE AGGREGATE, % > LIQUID LIMIT PLASTIC LIMIT PLASTICITY INDEX SAMPLE AIR DRIED YES NO FRACTURED FACES COARSE AGGREGATE BY WEIGHT ONE OR MORE FACES, % > CLEANNESS VALUE CA227 > DURABILITY INDEX ASTM D3744 AASHTO T210 PROCEDURE: A COARSE B FINE C COARSE & FINE Df > CARBONATES IN AGGREGATE, % > CASTM C142 AASHTO T112 COARSE AGGREGATE BY WEIGHT ONE OR MORE FACES, % > DURABILITY INDEX ASTM D3744 AASHTO T210 PROCEDURE: A COARSE B FINE C COARSE & FINE Df > CARBONATES IN AGGREGATE FLAT & ELONGATED PARTICLES ASTM D4791 BY WEIGHT, % >	
LIQUID LIMIT PLASTIC LIMIT PLASTICITY INDEX SAMPLE AIR DRIED YES NO CLEANNESS VALUE CA227 → DURABILITY INDEX ASTM D5821 FLH T507 FAA TWO OR MORE FACES, % → PROCEDURE: A COARSE B FINE C COARSE & FINE ORGANIC IMPURITIES ASTM C40 AASHTO T21 ORGANIC PLATE NO. → CASTM C142 AASHTO T112 COARSE AGGREGATE, % → TWO OR MORE FACES, % → TWO OR MORE FACES, % → DURABILITY INDEX ASTM D3744 AASHTO T210 PROCEDURE: A COARSE B FINE C COARSE & FINE Df → CARBONATES IN AGGREGATE FLAT & ELONGATED PARTICLES ASTM D4791 BY WEIGHT, % →	
PLASTIC LIMIT PLASTICITY INDEX SAMPLE AIR DRIED YES NO CLEANNESS VALUE CA227 + DURABILITY INDEX ASTM D5821 FLH T507 FAA TWO OR MORE FACES, % + PROCEDURE: A COARSE B FINE C COARSE & FINE CORGANIC PLATE NO. + CARBONATES IN AGGREGATE FLAT & ELONGATED PARTICLES ASTM D4791 BY WEIGHT, % +	
PLASTICITY INDEX SAMPLE AIR DRIED YES NO FRACTURED FACES COARSE AGGREGATE BY WEIGHT ONE OR MORE FACES, % > CLEANNESS VALUE CA227 > DURABILITY INDEX ASTM D3744 AASHTO T210 Dc > PROCEDURE: A COARSE B FINE C COARSE & FINE Df > CRGANIC PLATE NO. > CARBONATES IN AGGREGATE FLAT & ELONGATED PARTICLES ASTM D4791 BY WEIGHT, % >	
SAMPLE AIR DRIED YES NO ASTM D5821 FLH T507 FAA TWO OR MORE FACES, % > CLEANNESS VALUE CA227 > DURABILITY INDEX ASTM D3744 AASHTO T210 PROCEDURE: A COARSE B FINE C COARSE & FINE Df > ORGANIC IMPURITIES ASTM C40 AASHTO T21 UNCOMPACTED VOID CONTENT ASTM C1252 % > CARBONATES IN AGGREGATE FLAT & ELONGATED PARTICLES ASTM D4791 BY WEIGHT, % >	
CLEANNESS VALUE CA227 > DURABILITY INDEX ASTM D3744 AASHTO T210 DC PROCEDURE: A COARSE B FINE C COARSE & FINE Df > ORGANIC IMPURITIES ASTM C40 AASHTO T21 ORGANIC PLATE NO. > UNCOMPACTED VOID CONTENT ASTM C1252 % > CARBONATES IN AGGREGATE FLAT & ELONGATED PARTICLES ASTM D4791 BY WEIGHT, % >	
PROCEDURE: A COARSE B FINE C COARSE & FINE D; > ORGANIC IMPURITIES ASTM C40 AASHTO T21 ORGANIC PLATE NO. > UNCOMPACTED VOID CONTENT ASTM C1252 % > CARBONATES IN AGGREGATE FLAT & ELONGATED PARTICLES ASTM D4791 BY WEIGHT, % >	
PROCEDURE: A COARSE B FINE C COARSE & FINE D; > ORGANIC IMPURITIES ASTM C40 AASHTO T21 ORGANIC PLATE NO. > UNCOMPACTED VOID CONTENT ASTM C1252 % > CARBONATES IN AGGREGATE FLAT & ELONGATED PARTICLES ASTM D4791 BY WEIGHT, % >	
ORGANIC IMPURITIES ASTM C40 AASHTO T21 ORGANIC PLATE NO. UNCOMPACTED VOID CONTENT ASTM C1252 ** CARBONATES IN AGGREGATE FLAT & ELONGATED PARTICLES ASTM D4791 BY WEIGHT, **	
ORGANIC PLATE NO. → UNCOMPACTED VOID CONTENT ASTM C1252 % → CARBONATES IN AGGREGATE FLAT & ELONGATED PARTICLES ASTM D4791 BY WEIGHT, % →	
CARBONATES IN AGGREGATE FLAT & ELONGATED PARTICLES ☐ ASTM D4791 ☐ BY WEIGHT, % →	
DIMENSIONAL NATIO USED [1.2 [1.3 [] BY NUMBER, % 7	

Comments:

Copies To: CLIENT (2) - ELECTRONIC

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REVIEWED BY



PHYSICAL PROPERTIES OF AGGREGATES

Client ANDERSON ENGINEERING 977 WEST 2100 SOUTH SALT LAKE CITY, UT 84119 Date of Report 12-13-12 Job No. 3151JM098

Event / Invoice No. 315200185-25

Lab No. 0981118-

Authorized By C. SANCHEZ

Submitted By J. GISSEMAN

Date 10-22-12

Sampled By CLIENT

Date 11-02-12 Date 11-14-12

Location RICO, COLORADO

Arch. / Engr. ANDERSON ENGINEERING

Supplier / Source BORINGS

Source / Location Desig. By CLIENT

Date 11-02-12

Project RICO INITIAL SOLIDS

Contractor FLARE CONSTRUCTION

Type / Use of Aggregate VARIABLE

Sample Source / Location CHV-101S 45-46.5'

Special Instructions: 0981118-12

TEST RESULTS

SIEVE ANALYSIS X	ASTM C128	AASHTO T27		PHYSICAL PROPERTY	T150	TEST	
SIEVE ANALYSIS A	ACCUMULATIVE			PHYSICAL PROPER	HES	RESULTS	SPECIFICATION
U.S MM	% PASSING	SPECIFICATION					
4 IN100.0			UNIT WEIGHT &	VOIDS FINE AGGR	EGATE UNIT WEIGHT, PCF →		
3 - 75.0			ASTM C29	AASHTO T19	VOIDS, % →		
2 - 50.0			RODDING	JIGGING LOOSE COARSE AC	GGREGATE UNIT WEIGHT, PCF -		
1 1/2 - 37.5					VOIDS, % →		
1 1/4 - 31.5							
1 - 25.0				FINE AGGREGATE	BULK SPECIFIC GRAVITY -		
3/4 - 19.0				ASTM C128 AASHTO T84	BULK SPECIFIC GRAVITY (SSD) >		
1/2 - 12.5				AGGREGATE DRIED	APPARENT SPECIFIC GRAVITY -		
3/8 - 9.5			SPECIFIC	YES NO	ABSORPTION, % →		
1/4 - 6.3			GRAVITY				
NO. 4 - 4.75			& ABSORPTION	COARSE AGGREGATE	BULK SPECIFIC GRAVITY -		
8 - 2.36				ASTM C127 AASHTO T85	BULK SPECIFIC GRAVITY (SSD) →		
10 - 2.00				AGGREGATE DRIED	APPARENT SPECIFIC GRAVITY →		
16 - 1.18				YES NO	ABSORPTION, % →		
30600							
40425			SAND EQUIVALE	ENT VALUE ASTM D2419	AASHTO T176 % →		
50300			OAND ECONAL	IN TALLE CANADATA			
100150				SMALL COARSE AGGREGATE	100 REV., % LOSS →		
FINER THAN NO. 200			RESISTANCE	ASTM C131 AASHTO T96	10		
X ASTM C117	15.3		TO		300 Hz 1., % 2000 7		
ASHTO T11	15.5		DEGRADATION	LARGE COARSE AGGREGATE			
AASHIO III				ASTM C535 GRADING			
FINENESS MODULUS	ACTM C125				1000 REV., % LOSS →		
FINENESS MODULUS	, ASTN C125 3	`	LIGHTWEIGHT P	FINE AGGREGATE, % ->			
LIQUID & PLASTIC P	PODEDTIES		ASTM C123	AASHTO T113	COARSE AGGREGATE, % →		
ASTM D4318			Main C123		COALIGE AGGILEGATE, 76 7		
		SPECIFICATION	CLAVIIIMPE .	FRIABLE PARTICLES	FINE AGGREGATE, % ->		
METHOD LA LE	MESULI	SPECIFICATION	ASTM C142		COARSE AGGREGATE, % →		
LIQUID LIMIT			ASIMICI42		COARSE AGGREGATE, % 7		
PLASTIC LIMIT			FRACTURED FAC	CES COARSE AGGREGATE BY WEI	GHT ONE OR MORE FACES, % →		
PLASTICITY INDEX SAMPLE AIR DRIED				FLH T507 FAA	TWO OR MORE FACES, % →		
SAMPLE AIR DRIED	L YES L NO		ASTW 05621	FER 1907 FAR	TWO ON WORE PACES, 18 4		
OLEANNESS VALUE	CA227 -		DUDABILITY INC	DEX ASTM D3744 AASHTO	T210		
CLEANNESS VALUE	CA227 -			COARSE B FINE C CO	C		
OBCANIO MARKINETI	e	MARKETO TO	PROCEDURE: A	COARSE B FINE C CO	PARSE & FINE Df →		
ORGANIC IMPURITIE			UNCOMPACTED	VOID CONTENT ASTM C1252	% →		
ORGANIC PLATE NO			UNCOWPACTED	VOID CONTENT ASTWC1292 _			
CARRONATES IN AC	OBECATE		FLAT & ELONGA	TED PARTICLES ASTM D4791	BY WEIGHT, % →		
ARIZ 238 AST			DIMENSIONAL P				
MANIZ 238 MASI	IVI D3042 % 7		DIVIENSIONAL	1.2 1.3 1.9	Dr Homben, w		

Comments:

Copies To: CLIENT (2) - ELECTRONIC

THE SERVICES REFERRED TO HEREIN WERE PERFORMED IN ACCORDANCE WITH THE STANDARD OF CARE PRACTICED LOCALLY FOR THE REFERENCED METHOD(S) AND RELATE ONLY TO THE CONDITION(S) OR SAMPLE(S) TESTED AS STATED HEREIN. WESTERN TECHNOLOGIES INC. MAKES NO OTHER WARRANTY OR REPRESENTATION, EXPRESSED OR IMPLIED, AND HAS NOT CONFIRMED INFORMATION INCLUDING SOURCE OF MATERIALS SUBMITTED BY OTHERS.

REVIEWED BY



PHYSICAL PROPERTIES OF SOILS & AGGREGATES

Client ANDERSON ENGINEERING 977 WEST 2100 SOUTH SALT LAKE CITY, UT 84119 Date of Report 01-08-13 Job No. 3151JM098

Event / Invoice No. 31520185-20

Lab No. 0981113-2

Authorized by CHRIS SANCHEZ

Date 10-22-12

Sampled by CLIENT

Date 11-11-12

Submitted by J. GISSEMAN

Date 11-14-12

Project RICO INITIAL SOLIDS REMOVAL AND DRYING

Contractor FLARE CONSTRUCTION

Type / Use of Material 1" MINUS CLAYEY SAND WITH GRAVEL

Sample Source / Location MW-202 SONIC, 1.5-12'

Testing Authorized : Special Instructions : Location RICO, COLORADO

Arch. / Engr. ANDERSON ENGINEERING

Supplier / Source BORINGS
Source / Location Desig. By CLIENT

Date 11-11-12

TEST RESULTS

FINER THAN NO. 200 : ASTM C117 SIEVE ACCUMULATIVE SPECIFICATE 6 5 4 3 2 1 1/2 1 100 3/4 97 1/2 89 3/8 79	UNIT WEIGHT, LBF/FT ³ 52 00 00				SAMPLE PREPARATION: RAMMER USED: X 2 IN, CIRCULAR FACE MECHANICAL PROJECT PROCTOR ID: 111	X MANUA	Flor Andrews
1/4 69 No.4 65 8 54 10 53 16 46 30 41 40 38	DRY UNIT WEI	/			MAXIMUM DENSITY, LBF/FT OPTIMUM MOISTURE CONTI OVERSIZE AGGREGATE: ASSUMED BULK SPECIFIC ASSUMED ABSORPTION, 9 6 OVERSIZE IN LAB SAMP ASSUMED SPECIFIC GRAVIT IN ZERO AIR VOID CURVE	3 → ENT, % → GRAVITY :: K ::	1.0
50 35 100 29	,		5.5	8.0 10.5			
200 25			MOISTUR	RE, % DRY WEIGHT			
TEST PROCEDURE		RESULT	SPECS	TEST PROCE	DURE	RESULT	SPECS
ESTIMATED % RETAINED ON NO. 40 62 PI	LIQUID LIMIT → ASTIC LIMIT → TICITY INDEX →	30 21 9		RESISTANCE TO DEGRADATION OF S AGGREGATES BY ABRASION : GRADING GRADING SPECIFIC GRAVITY :	100 REV. % LOSS →		
	DRY WEIGHT -	20.9		OVERSON DESCRIPTION OF THE PROPERTY OF THE PRO	PECIFIC GRAVITY @ 20°C >		
EXPANSION / COMPRESSION PROPERTIES OF COM EXPANSION COM				pH DETERMINATION :	рН →		
MAXIMUM SWELL PR SURCHARGE, KSF	ESSURE, KSF →			SOLUBLE SALTS :	PPM →		
INITIAL WATER CONTENT, % DRY DENSIT	Y, PCF			MINIMUM RESISTIVITY :	онм-см →		

Comments:

Copies to : CLIENT (1)

THE SERVICES REFERRED TO HEREIN WERE PERFORMED IN ACCORDANCE WITH THE STANDARD OF CARE PRACTICED LOCALLY FOR THE REFERENCED METHODIS! AND RELATE ONLY TO THE CONDITIONIS! OR SAMPLEIS! TESTED AS STATED HEREIN WESTERN TECHNOLOGIES INC. MAKES NO OTHER WARRANTY OR REPRESENTATION, EXPRESSED OR IMPLIED, AND HAS NOT CONFIRMED INFORMATION INCLUDING SOURCE OF MATERIALS SUBMITTED BY OTHERS.



LABORATORY REPORT

Date of Report 12-11-12

Job No. 3151JM098

Event / Invoice No. 31520185-20

Lab No.

Authorized By C. SANCHEZ

Date 10-22-12

Sampled By CLIENT Submitted By J. GISSEMAN Date 11-11-12

Date 11-14-12

Project RICO INITIAL SOLIDS REMOVAL & DRYING

Client ANDERSON ENGINEERING COMPANY, INC.

Contractor FLARE CONSTRUCTION

Type / Use of Material VARIOUS

Sample Source / Location MW-202 SONIC

977 WEST 2100 SOUTH

SALT LAKE CITY, UT 84119

Location RICO, COLORADO

Arch. / Engr. ANDERSON ENGINEERING

Supplier / Source BORINGS

Source / Location Desig. By 11-14-12

Date

Reference: ASTM Special Instructions:

TEST RESULTS

ELEVATION (FT)	MOISTURE CONTENT (%)	ATTERBERGS:	LL	PL	PI	ORGANIC CONTENT (%)
0-1.5'	19.0					
1.5-6'	20.0					
6-9'	14.1					
9-12'	18.2					
12-18'	24.0					
18-23'	13.1					
23-30'	36.0					
30-35.5'	9.7					
18-23' 23-30'	13.1 36.0					

Comments: SEE ADDITIONAL PHYSICAL PROPERTIES REPORTS FOR **GRADATIONS**

Copies To: CLIENT (2)

REVIEWED BY

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PHYSICAL PROPERTIES OF AGGREGATES

Client ANDERSON ENGINEERING **977 WEST 2100 SOUTH** SALT LAKE CITY, UT 84119 Date of Report 12-11-12 Job No. 3151JM098

Event / Invoice No. 315200185-20

Lab No. 0981113

Authorized By C. SANCHEZ

Date 10-24-12 Date 11-11-12

Sampled By CLIENT Submitted By J. GISSEMAN

Date 11-14-12

Project RICO INITIAL SOLIDS Contractor FLARE CONSTRUCTION Type / Use of Aggregate VARIABLE

Arch. / Engr. ANDERSON ENGINEERING

Source / Location Desig. By CLIENT

Supplier / Source BORINGS

Location RICO, COLORADO

Date 11-11-12

Sample Source / Location MW-202 SONIC 0-1.5' Special Instructions: 0981113-1

TEST RESULTS

-				TEOT HEODEIO	TEGT	T
SIEVE ANALYSIS	ASTM C136	AASHTO T27		PHYSICAL PROPERTIES	RESULTS	SPECIFICATION
SIEVE SIZE U.S. – MM	ACCUMULATIVE % PASSING	SPECIFICATION				
4 IN100.0			UNIT WEIGHT &	VOIDS FINE AGGREGATE UNIT WEIGHT, PCF		
3 - 75.0			ASTM C29	☐ AASHTO T19 VOIDS, % →		
2 - 50.0			The second second second	JIGGING LOOSE COARSE AGGREGATE UNIT WEIGHT, PCF		
1 1/2 - 37.5				VOIDS, % +		
1 1/4 - 31.5						
1 - 25.0	100			FINE AGGREGATE BULK SPECIFIC GRAVITY		
3/4 - 19.0	63			ASTM C128 AASHTO T84 BULK SPECIFIC GRAVITY (SSD)		
1/2 - 12.5	55			AGGREGATE DRIED APPARENT SPECIFIC GRAVITY		
3/8 - 9.5	51		SPECIFIC	TYES TNO ABSORPTION, % -		
1/4 - 6.3	45		GRAVITY			-
NO. 4 - 4.75	43		& ABSORPTION	COARSE AGGREGATE BULK SPECIFIC GRAVITY		
8 - 2.36	38	1		ASTM C127 AASHTO T85 BULK SPECIFIC GRAVITY (SSD)		
10 - 2.00	37			AGGREGATE DRIED APPARENT SPECIFIC GRAVITY		
16 - 1.18	33			TYES TNO ABSORPTION, % -		
30600	30			Land State S		
40425	28		SAND EQUIVAL	ENT VALUE ASTM D2419 AASHTO T176 % -		
50300	26				ļ	
100150	20			SMALL COARSE AGGREGATE 100 REV., % LOSS =		
FINER THAN NO. 200			RESISTANCE	ASTM C131 AASHTO T96 GRADING 500 REV., % LOSS		
X ASTM C117	13.0		то		 	
AASHTO T11			DEGRADATION	LARGE COARSE AGGREGATE 200 REV., % LOSS =		
				☐ ASTM C535 GRADING 1000 REV., % LOSS →		
FINENESS MODULUS	S, ASTM C125 -				-	+
			LIGHTWEIGHT F			
LIQUID & PLASTIC F	PROPERTIES		ASTM C123	☐ AASHTO T113 COARSE AGGREGATE, % →	•	
ASTM D4318	X AASHTO T89 8	§ ⊤90		18.00		+
METHOD A X	B RESULT	SPECIFICATION	CLAY LUMPS &	FRIABLE PARTICLES FINE AGGREGATE, %	•	
LIQUID LIMIT	NV		ASTM C142	☐ AASHTO T112 COARSE AGGREGATE, % →		
PLASTIC LIMIT	NV					-
PLASTICITY INDEX	NP		FRACTURED FA	CES COARSE AGGREGATE BY WEIGHT ONE OR MORE FACES, % +	•	
SAMPLE AIR DRIED	X YES NO		ASTM D582	1 FLH T507 FAA TWO OR MORE FACES, % -	•	
					 	
CLEANNESS VALUE	CA227 -		DURABILITY IN		•	
			PROCEDURE:	A COARSE B FINE C COARSE & FINE Df		
ORGANIC IMPURITIE	S ASTM C40	AASHTO T21				
ORGANIC PLATE NO	. -	•	UNCOMPACTED	VOID CONTENT ASTM C1252 5		
CARBONATES IN AG			S. SCHOOL SEE SHARPONESSE	ATED PARTICLES		
ARIZ 238 AS	TM D3042 % -		DIMENSIONAL F	RATIO USED 1:2 1:3 1:5 BY NUMBER, % -		

Comments:

Copies To: CLIENT (2) - ELECTRONIC

THE SERVICES REFERRED TO HEREIN WERE PERFORMED IN ACCORDANCE WITH THE STANDARD OF CARE PRACTICED LOCALLY FOR THE REFERENCED METHOD(S) AND RELATE ORLY TO THE CONDITION(S) OR SAMPLE(S) TESTED AS STATED HEREIN. WESTERN TECHNOLOGIES INC. MAKES NO OTHER WARRANTY OR REPRESENTATION, EXPRESSED OR IMPLIED, AND HAS NOT CONFIRMED INFORMATION INCLUDING SOURCE OF MATERIALS SUBMITTED BY OTHERS.

REVIEWED BY



PHYSICAL PROPERTIES OF SOILS & AGGREGATES

Client ANDERSON ENGINEERING 977 WEST 2100 SOUTH SALT LAKE CITY, UT 84119 Date of Report 12-14-12

Job No. 3151JM098

Event / Invoice No. 31520185-20

Authorized by CHRIS SANCHEZ
Sampled by CLIENT

Submitted by J. GISSEMAN

Lab No. 0981113-2

Date 10-22-12 Date 11-11-12

Date 11-14-12

Project RICO INITIAL SOLIDS REMOVAL AND DRYING

Contractor FLARE CONSTRUCTION

Type / Use of Material 1" MINUS CLAYEY SAND WITH GRAVEL

Sample Source / Location MW-202 SONIC, 1.5-6

Testing Authorized : Special Instructions :

Location RICO, COLORADO

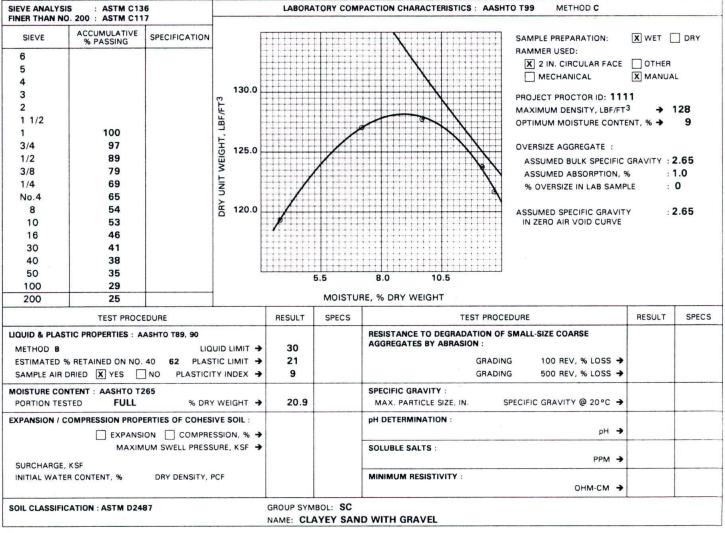
Arch. / Engr. ANDERSON ENGINEERING

Supplier / Source BORINGS

Source / Location Desig. By CLIENT

Date 11-11-12

TEST RESULTS



Comments:

Copies to: CLIENT (1)

THE SERVICES REFERRED TO HEREIN WERE PERFORMED IN ACCORDANCE WITH THE STANDARD OF CARE PRACTICED LOCALLY FOR THE REFERENCE METHODIS) AND RELATE ONLY TO THE CONDITIONS) OR SAMPLEIS) TESTED AS STATED HEREIN. WESTERN TECHNOLOGIES INC. MAKES NO OTHER WARRANTY OR REPRESENTATION, EXPRESSED OR IMPLIED, AND HAS NOT CONFIRMED INFORMATION INCLUDING SOURCE OF MATERIALS SUBMITTED BY OTHERS.



PHYSICAL PROPERTIES **OF SOILS & AGGREGATES**

Client ANDERSON ENGINEERING 977 WEST 2100 SOUTH SALT LAKE CITY, UT 84119 Date of Report 12-14-12 Job No. 3151JM098

Event / Invoice No. 31520185-20

Lab No. 0981113-5

Authorized by CHRIS SANCHEZ Sampled by **CLIENT**

Date 10-22-12

Date 11-11-12

Submitted by J. GISSEMAN

Date 11-14-12

Project RICO INITIAL SOLIDS REMOVAL AND DRYING

Contractor FLARE CONSTRUCTION

Type / Use of Material 3/4" MINUS GRAVEL WITH SAND/CLAY

Sample Source / Location MW-202 SONIC, 12-30'

Testing Authorized:

Special Instructions:

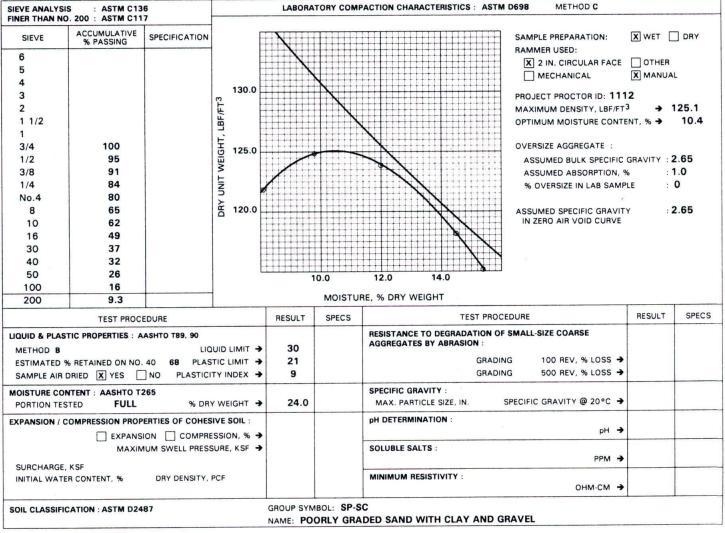
Location RICO, COLORADO Arch. / Engr. ANDERSON ENGINEERING

Supplier / Source BORINGS

Source / Location Desig. By CLIENT

Date 11-11-12

TEST RESULTS



Comments:

Copies to: CLIENT (1)

THE SERVICES REFERRED TO HEREIN WERE PERFORMED IN ACCORDANCE WITH THE STANDARD OF CARE PRACTICED LOCALLY FOR THE REFERENCED METHODIS) AND RELATE ONLY TO THE CONDITIONIS OR SAMPLEIS) TESTED AS STATED HEREIN. WESTERN TECHNOLOGIES INC. MAKES NO OTHER WARRANTY OR REPRESENTATION, EXPRESSED OR IMPLIED, AND HAS NOT CONFIRMED INFORMATION INCLUDING SOURCE OF MATERIALS SUBMITTED BY OTHERS.



LABORATORY REPORT

Date of Report 12-13-12

Job No. 3151JM098

Event / Invoice No. 31520185-26

Lab No.

Authorized By C. SANCHEZ

Date 10-22-12 Date 11-07-12

Sampled By CLIENT Submitted By J. GISSEMAN

Date 11-14-12

Project RICO INITIAL SOLIDS REMOVAL & DRYING

Client ANDERSON ENGINEERING COMPANY, INC.

Contractor FLARE CONSTRUCTION

Type / Use of Material VARIOUS

Sample Source / Location MW-204 SONIC

977 WEST 2100 SOUTH

SALT LAKE CITY, UT 84119

Location RICO, COLORADO

Arch. / Engr. ANDERSON ENGINEERING

Supplier / Source BORINGS

Source / Location Desig. By CLIENT

Date 11-07-12

Reference: ASTM Special Instructions:

TEST RESULTS

ELEVATION (FT)	MOISTURE CONTENT (%)	ATTERBERGS:	LL	PL	PI	ORGANIC CONTENT (%)
0-7'	7.9					
7-10.5'	9.7		29	19	10	
10.5-12'	9.4					
12-15'	14.4		29	19	10	
21-25.5'	16.6					

Comments: SEE ADDITIONAL PHYSICAL PROPERTIES REPORTS FOR **GRADATIONS**

Copies To: CLIENT (2)

REVIEWED BY

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PHYSICAL PROPERTIES OF AGGREGATES

Client ANDERSON ENGINEERING 977 WEST 2100 SOUTH SALT LAKE CITY, UT 84119 Date of Report 12-13-12

Job No. 3151JM098

Event / Invoice No. 315200185-26

Lab No. 09811120

Authorized By C. SANCHEZ

Date 10-22-12

Sampled By CLIENT
Submitted By J. GISSEMAN

Date 11-07-12 Date 11-14-12

Location RICO, COLORADO

Arch. / Engr. ANDERSON ENGINEERING

Supplier / Source BORINGS

Source / Location Desig. By CLIENT

Date 11-07-12

Project RICO INITIAL SOLIDS

Contractor FLARE CONSTRUCTION

Type / Use of Aggregate VARIABLE

Sample Source / Location MW-204 SONIC 0-7'

Special Instructions: 0981120-1

TEST RESULTS

				TEST RESULTS			AND THE PARTY OF THE PARTY.	
SIEVE ANALYSIS		AASHTO T27		PHYSICAL PROPER	RTIES	TEST RESULTS	SPECIFICATION	
SIEVE SIZE U.S. – MM	ACCUMULATIVE % PASSING	SPECIFICATION				1,20213		
4 IN100.0 3 - 75.0 2 - 50.0 1 1/2 - 37.5			UNIT WEIGHT 8	VOIDS FINE AGGF AASHTO T19 JIGGING LOOSE COARSE A	VOIDS, % →			
1 1/4 - 31.5 1 - 25.0 3/4 - 19.0 1/2 - 12.5 3/8 - 9.5 1/4 - 6.3	100 72 56 44 32	SPECIFIC GRAVITY	FINE AGGREGATE ASTM C128 AASHTO T84 AGGREGATE DRIED YES NO	BULK SPECIFIC GRAVITY → BULK SPECIFIC GRAVITY (SSD) → APPARENT SPECIFIC GRAVITY → ABSORPTION, % →				
NO. 4 - 4.75 8 - 2.36 10 - 2.00 16 - 1.18 30600	26 18 16 13		ABSORPTION	COARSE AGGREGATE ASTM C127 AASHTO T85 AGGREGATE DRIED YES NO	BULK SPECIFIC GRAVITY → BULK SPECIFIC GRAVITY (SSD) → APPARENT SPECIFIC GRAVITY → ABSORPTION, % →			
40425	8.6		SAND EQUIVAL	ENT VALUE ASTM D2419	AASHTO T176 % →			
50300 100150	7.2 4.9			SMALL COARSE AGGREGATE	100 REV., % LOSS →		8	
FINER THAN NO. 200 X ASTM C117 AASHTO T11	3.0			RESISTANCE TO DEGRADATION	LARGE COARSE AGGREGATE ASTM C535 GRADING	GRADING 500 REV., % LOSS → 200 REV., % LOSS → 1000 REV., % LOSS →		
FINENESS MODULUS			LIGHTWEIGHT		FINE AGGREGATE, % ->			
LIQUID & PLASTIC PROPERTIES ASTM D4318 AASHTO T89 & T90 METHOD A B RESULT SPECIFICATION LIQUID LIMIT		SPECIFICATION		FRIABLE PARTICLES AASHTO T112	FINE AGGREGATE, % → COARSE AGGREGATE, % →			
PLASTIC LIMIT PLASTICITY INDEX SAMPLE AIR DRIED	YES NO		FRACTURED FA					
CLEANNESS VALUE	CA227 -		DURABILITY INI	DEX ASTM D3744 AASHTO	C C			
ORGANIC IMPURITIES		CONTRACTOR OF STREET	1	VOID CONTENT ASTM C1252				
CARBONATES IN AG			FLAT & ELONGA DIMENSIONAL F	ATED PARTICLES ASTM D4791 ARATIO USED 1:2 1:3 1:5				

Comments:

Copies To: CLIENT (2) - ELECTRONIC

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REVIEWED BY



PHYSICAL PROPERTIES **OF AGGREGATES**

Client ANDERSON ENGINEERING **977 WEST 2100 SOUTH** SALT LAKE CITY, UT 84119 Date of Report 12-13-12 Job No. 3151JM098

Event / Invoice No. 315200185-26

Lab No. 09811120

Authorized By C. SANCHEZ

Submitted By J. GISSEMAN

Date 10-22-12

Sampled By CLIENT

Date 11-07-12 Date 11-14-12

Project RICO INITIAL SOLIDS Contractor FLARE CONSTRUCTION Type / Use of Aggregate VARIABLE

Arch. / Engr. ANDERSON ENGINEERING

Supplier / Source BORINGS

Location RICO, COLORADO

Source / Location Desig. By CLIENT

Date 11-07-12

Sample Source / Location MW-204 SONIC 10.5-12'

Special Instructions: 0981120-3

TEST RESULTS

				TEST RESULTS		TEST RESULTS		
SIEVE ANALYSIS	X ASTM C136	AASHTO T27		PHYSICAL PROPERTIES				
SIEVE SIZE	% PASSING	SPECIFICATION						
4 IN100.0			UNIT WEIGHT 8	VOIDS FINE AGGR	EGATE UNIT WEIGHT, PCF →			
3 - 75.0			The second secon	AASHTO T19	VOIDS, % →			
2 - 50.0			RODDING	JIGGING LOOSE COARSE AG	Committee of the same of the s			
1 1/2 - 37.5					VOIDS, % →			
1 1/4 - 31.5					7			
1 - 25.0	100			FINE AGGREGATE	BULK SPECIFIC GRAVITY →			
3/4 - 19.0	87			ASTM C128 AASHTO T84	BULK SPECIFIC GRAVITY (SSD) -			
1/2 - 12.5	68			AGGREGATE DRIED	APPARENT SPECIFIC GRAVITY →			
3/8 - 9.5	54		SPECIFIC	TYES NO	ABSORPTION, % →			
1/4 - 6.3	41		GRAVITY		ABSON TION, N			
NO. 4 - 4.75	33		& ABSORPTION	COARSE AGGREGATE	BULK SPECIFIC GRAVITY -			
8 - 2.36	22		ABSURFIUN	ASTM C127 AASHTO T85	BULK SPECIFIC GRAVITY (SSD) -			
10 - 2.00	19			AGGREGATE DRIED	APPARENT SPECIFIC GRAVITY →			
16 - 1.18	15			TYES NO	ABSORPTION, % →			
30600	11			LITES LINO	ABSORPTION, N. 4			
40425	8.9		SAND EQUIVAL	ENT VALUE ASTM D2419	AASHTO T176 % →			
50300	7.4		SAND EQUIVAL	ENI VALUE ASIM DZ419	AASH10 1176 % 7			
100150	4.8			SMALL COARSE AGGREGATE	100 REV., % LOSS →			
				ASTM C131 AASHTO T96	COMPONENCE CONTRACTOR AND ADDRESS OF THE PROPERTY OF THE			
X ASTM C117	2.6		RESISTANCE TO	ASTW CTSTAASHTO 196 G	300 REV., % 1033 7			
	2.0		DEGRADATION	LARGE COARSE AGGREGATE	200 REV., % LOSS →			
AASHTO T11				ASTM C535 GRADING	1000 REV., % LOSS →			
511511505 MODIU				ASIM C535 GRADING	1000 REV., % LOSS 7			
HNENESS MODUL	US, ASTM C125 -		LIGHTWEIGHT	NECES	FINE AGGREGATE, % ->			
	PROPERTIES		ASTM C123		COARSE AGGREGATE, % →			
LIQUID & PLASTIC			ASIM C123	AASH10 1113	COARSE AGGREGATE, % 7			
METHOD A		SPECIFICATION	01 AV 1111ADA 0	FRIABLE PARTICLES	SING ACCRECATE W. A			
CAROLING VICTORIAN CONTRACTOR CON	J B RESULT	SPECIFICATION		AASHTO T112	FINE AGGREGATE, % → COARSE AGGREGATE, % →			
LIQUID LIMIT			ASIM C142	AASH10 T112	COARSE AGGREGATE, % 7			
PLASTIC LIMIT			EDACTURES 54	CES COARSE AGGREGATE BY WEI	CHT. ONE OR MORE FACES W. A.			
PLASTICITY INDEX			FRACTURED FA	FLH T507 FAA				
SAMPLE AIR DRIE	D LYES L NO		ASIM D582	1FLH 1507FAA	TWO OR MORE FACES, % →			
			DUDABULTY	DEX ASTM D3744 AASHTO	7210			
CLEANNESS VALU	CA227 -			A COARSE B FINE C C	· ·			
OPCANIC MARKET	TIES ASTM C40	DAACHTO TO	1	A COARSE B FINE C CO	DARSE & FINE Df			
				VOID CONTENT ASTM C1252	ν			
ORGANIC PLATE N	10. 1		UNCOMPACTED	ASTWICT252	% →			
CARBONATES IN	ACCRECATE		ELAT & ELONG	ATED PARTICLES ASTM D4791	BY WEIGHT, % →			
	STM D3042 %		Schedules manufactures	RATIO USED 1:2 1:3 1:5				
LARIZ 238 LA	3 IN D3042 % 7		DIVIENSIONAL	14110 0320 [1:2 [1:3 [1:5	BT NOWIBER, % 7			

Comments:

Copies To: CLIENT (2) - ELECTRONIC

THE SERVICES REFERRED TO HEREIN WERE PERFORMED IN ACCORDANCE WITH THE STANDARD OF CARE PRACTICED LOCALLY FOR THE REFERENCED METHOD(S) AND RELATE ONLY TO THE CONDITION(S) OR SAMPLE(S) TESTED AS STATED HEREIN. WESTERN TECHNOLOGIES INC. MAKES NO OTHER WARRANTY OR REPRESENTATION, EXPRESSED OR IMPLIED, AND HAS NOT CONFIRMED INFORMATION INCLUDING SOURCE OF MATERIALS SUBMITTED BY OTHERS.

REVIEWED BY_



PHYSICAL PROPERTIES OF AGGREGATES

Client ANDERSON ENGINEERING 977 WEST 2100 SOUTH SALT LAKE CITY, UT 84119 Date of Report 12-13-12

Job No. 3151JM098

Event / Invoice No. 315200185-26

Lab No. 09811120

Authorized By C. SANCHEZ

Date 10-22-12

Sampled By CLIENT
Submitted By J. GISSEMAN

Date 11-07-12 Date 11-14-12

Project RICO INITIAL SOLIDS
Contractor FLARE CONSTRUCTION
Type / Use of Aggregate VARIABLE

Sample Source / Location MW-204 SONIC 21-25.5'

Special Instructions: 0981120-5

Location RICO, COLORADO
Arch. / Engr. ANDERSON ENGINEERING

Supplier / Source BORINGS

Source / Location Desig. By CLIENT

Date 11-07-12

TEST RESULTS

Service Size Accumulative Specification W. Passing	SIEVE ANALYSIS	ASTM C136	AASHTO T27		PHYSICAL PROPERTIES						
ASTM C29	SIEVE SIZE U.S MM	ACCUMULATIVE % PASSING	SPECIFICATION				RESULTS				
2 - 50.0	4 IN100.0			UNIT WEIGHT 8	EGATE UNIT WEIGHT, PCF →						
1 1/2 - 37.5 1 1/4 - 31.5 1 - 25.0 3/4 - 19.0 69 3/4 - 19.0 69 3/8 - 9.5 56 3/8 - 9.5 1/4 - 6.3 49 NO. 4 - 4.75 8 - 2.36 37 10 - 2.00 35 16 - 1.18 29 30 - 5.00 10 - 2.00 35 10 - 2.00 35 10 - 2.00 35 10 - 2.00 35 10 - 2.00 35 10 - 2.00 35 10 - 1.18 29 30 - 5.00 24 40 - 4.25 22 50 - 3.300 18 100 - 1.150 12 INERTHAN NO. 200 XI ASTM C117 AASHTO T11 AASHTO T11 AASHTO T11 AASHTO T11 INERESS MODULUS, ASTM C125 → LIQUID & PLASTIC PROPERTIES METHOD □ A □ B RESULT GENERAL STIM C123 ASTM C123 ASSMED FINE AGGREGATE BULK SPECIFIC GRAVITY → BULK SPECIFIC G	3 - 75.0			ASTM C29	AASHTO T19	VOIDS, % →					
1 1/4 - 31.5	2 - 50.0			RODDING	JIGGING LOOSE COARSE A	GGREGATE UNIT WEIGHT, PCF ->					
1 - 25.0	11/2 - 37.5					VOIDS, % ->					
ASTM C128 AASHTO T84 AGGREGATE ORIGINAL PROCEDURE AGGREGATE	1 1/4 - 31.5							+			
Agregate Dried	1 - 25.0	100			FINE AGGREGATE	BULK SPECIFIC GRAVITY ->					
1/2 - 12.5 59 3/8 - 9.5 56 56 56 56 56 56 56	3/4 - 19.0	69			☐ ASTM C128 ☐ AASHTO T84	BULK SPECIFIC GRAVITY (SSD) -					
3/8 - 9.5 56 1/4 - 6.3 49 ABSORPTION ABSORPT	1/2 - 12.5				AGGREGATE DRIED	APPARENT SPECIFIC GRAVITY ->					
NO. 4 - 4.75	and the same of th			SPECIFIC	TYES TNO	ABSORPTION, % →					
NO. 4 - 4.75		100000									
ASTM C127 AASHTO T85 BULK SPECIFIC GRAVITY (SSD) → AGGREGATE ORIGO AGGREGATE ORIGO AGGREGATE ORIGO ABSORPTION, % → ABSORPTION, %		5.05			COARSE AGGREGATE	BULK SPECIFIC GRAVITY -					
10 - 2.00 35				A SOUTH FIRM	The state of the s	TOTAL COMMISSION OF THE PARTY O					
16 - 1.18 29						SECRETARY COUNTY SECURI CHEEN DESCRIPTION OF THE PROPERTY OF T					
30600						AND CONTRACTOR CONTRAC		1			
40425						ABBOTT TIBLE, A F		ļ			
SMALL COARSE AGGREGATE 100 REV., % LOSS → INER THAN NO. 200 AASHTO 111 AASHTO 111 AASHTO 111 AASHTO 111 AASHTO 111 ASTM C125 → LIGHTWEIGHT PIECES ASTM C123 AASHTO 1113 COARSE AGGREGATE, % → LIGUID & PLASTIC PROPERTIES ASTM C131 AASHTO 1113 COARSE AGGREGATE, % → LIGUID & PLASTIC PROPERTIES ASTM C123 AASHTO 1113 COARSE AGGREGATE, % → LIGHTWEIGHT PIECES FINE AGGREGATE, % → CLAY LUMPS & FRIABLE PARTICLES FINE AGGREGATE, % → ASTM C142 AASHTO 1112 COARSE AGGREGATE, % → CLASTICITY INDEX FRACTURED FACES COARSE AGGREGATE BY WEIGHT ONE OR MORE FACES, % → CLEANICITY INDEX ASTM D5821 FLH T507 FAA TWO OR MORE FACES, % → DURABILITY INDEX ASTM D3744 AASHTO T210 D _C → PROCEDURE: A COARSE B FINE C COARSE & FINE D DRIGANIC IMPURITIES ASTM C40 AASHTO T21 DRIGANIC PLATE NO. → UNCOMPACTED VOID CONTENT ASTM C1252 % →				SAND FOUNTAL	ENT VALUE DASTM D2419	AASHTO T176 % ->					
SMALL COARSE AGGREGATE 100 REV., % LOSS + ASTM C117 AASHTO T11 AASHTO T96 GRADING 500 REV., % LOSS + ASTM C117 AASHTO T11 AASHTO T96 GRADING 500 REV., % LOSS + ASTM C35 GRADING 1000 REV., % LOSS + ASTM C35 GRAD				SAND EQUIVAL	ENT VALUE ASTMIDIZATE	AASH101170 % 7		1			
ASTM C117 AASHTO T16 AASHTO T16 AASHTO T11 AASHTO T12 AASHTO T11 AASH	(300,000)				SMALL COARSE ACCREGATE	100 BEV % 1088 A					
ASTM C117 AASHTO T11 TO DEGRADATION LARGE COARSE AGGREGATE ASTM C535 GRADING LARGE COARSE AGGREGATE ASTM C535 GRADING LOON REV., % LOSS > LIGHTWEIGHT PIECES ASTM D4318 AASHTO T133 COARSE AGGREGATE, % > LIGHTWEIGHT PIECES ASTM C123 AASHTO T113 COARSE AGGREGATE, % > LIGUID LIMIT PLASTIC LIMIT PROCEDURE: ASTM D5821 DURABILITY INDEX ASTM D5821 DURABILITY INDEX ASTM D3744 AASHTO T210 DC PROCEDURE: A COARSE B FINE C COARSE & FINE DIRABILITY INDEX ASTM C1252 WHO OR MORE FACES, % > CLAY LUMPS & FRIABLE PARTICLES FINE AGGREGATE, % > COARSE AGGREGATE, % > DURABILITY INDEX ASTM D3744 AASHTO T210 DC PROCEDURE: A COARSE B FINE C COARSE & FINE DIRABILITY INDEX ASTM C1252 UNCOMPACTED VOID CONTENT ASTM C1252						CONTROL AND THE ACCOUNT OF THE ACCOUNT OF THE					
DEGRADATION LARGE COARSE AGGREGATE ASTM C125 → LIGHTWEIGHT PIECES ASTM C123					ASIM CI31 AASHIO 198 C	300 REV., % LOSS 4					
ASTM C535 GRADING 1000 REV., % LOSS → LIGHTWEIGHT PIECES ASTM D4318 AASHTO T89 & T90 METHOD A B RESULT SPECIFICATION CLAY LUMPS & FRIABLE PARTICLES PLASTIC LIMIT PLASTICITY INDEX SAMPLE AIR DRIED YES NO CLAY LUMPS & FRIABLE PARTICLES FINE AGGREGATE, % → CLAY LUMPS & FRIABLE PARTICLES FRACTURED FACES COARSE AGGREGATE BY WEIGHT ONE OR MORE FACES, % → ASTM D5821 FLH T507 FAA TWO OR MORE FACES, % → CLEANNESS VALUE CA227 → DURABILITY INDEX ASTM D3744 AASHTO T210 DRGANIC IMPURITIES ASTM C40 AASHTO T21 DRGANIC PLATE NO. → UNCOMPACTED VOID CONTENT ASTM C1252 % →	The second second	7.6				200 0514 % 1000 3					
LIGHTWEIGHT PIECES LIGUID & PLASTIC PROPERTIES ASTM D4318 AASHTO T89 & T90 METHOD AB RESULT SPECIFICATION CLAY LUMPS & FRIABLE PARTICLES FINE AGGREGATE, % → CLAY LUMPS & FRIABLE PARTICLES FOR AGGREGATE, % → CLAY LUMPS & FRIABLE PARTICLES FOR AGGREGATE, % → CLAY LUMPS & FRIABLE PARTICLES	AASHTO T11										
LIQUID & PLASTIC PROPERTIES ASTM C123 AASHTO T113 COARSE AGGREGATE, % → ASTM D4318 AASHTO T89 & T90 METHOD A B RESULT SPECIFICATION CLAY LUMPS & FRIABLE PARTICLES FINE AGGREGATE, % → LIQUID LIMIT PLASTIC LIMIT PLASTIC LIMIT PLASTICITY INDEX SAMPLE AIR DRIED YES NO CLAY LUMPS & FRIABLE PARTICLES FINE AGGREGATE, % → ASTM C142 AASHTO T112 COARSE AGGREGATE, % → ASTM D5821 FLH T507 FAA TWO OR MORE FACES, % → CLEANNESS VALUE CA227 → DURABILITY INDEX ASTM D3744 AASHTO T210 PROCEDURE: A COARSE B FINE C COARSE & FINE Df → UNCOMPACTED VOID CONTENT ASTM C1252 SHOW AS	FINENESS MODULUS	, ASTM C125 -	•								
ASTM D4318 AASHTO T89 & T90 METHOD A B RESULT SPECIFICATION CLAY LUMPS & FRIABLE PARTICLES FINE AGGREGATE, % → LIQUID LIMIT PLASTIC LIMIT PLASTIC LIMIT PLASTICITY INDEX SAMPLE AIR DRIED YES NO CLAY LUMPS & FRIABLE PARTICLES FINE AGGREGATE, % → FRACTURED FACES COARSE AGGREGATE BY WEIGHT ONE OR MORE FACES, % → ASTM D5821 FLH T507 FAA TWO OR MORE FACES, % → PROCEDURE: A COARSE B FINE C COARSE & FINE Df → ORGANIC IMPURITIES ASTM C40 AASHTO T21 ORGANIC PLATE NO. → UNCOMPACTED VOID CONTENT ASTM C1252						TARE A CENTRAL TRANSPORT OF THE AVERAGE AND AND ADDRESS OF THE AVERAGE AND					
METHOD A B RESULT SPECIFICATION CLAY LUMPS & FRIABLE PARTICLES LIQUID LIMIT PLASTIC LIMIT PLASTIC LIMIT PLASTICITY INDEX SAMPLE AIR DRIED YES NO DURABILITY INDEX ASTM D5821 FLH T507 FAA TWO OR MORE FACES, % > PROCEDURE: A COARSE B FINE C COARSE & FINE DIAGNIC IMPURITIES ASTM C40 AASHTO T21 ORGANIC PLATE NO. > DIAGNIC MPURITIES ASTM C40 AASHTO T21 ORGANIC PLATE NO. > DIAGNIC MPURITIES ASTM C40 AASHTO T21 UNCOMPACTED VOID CONTENT ASTM C1252 % >	The second secon			ASIM C123	☐ AASHIO III3	COARSE AGGREGATE, % 7					
ASTM C142 AASHTO T112 COARSE AGGREGATE, % > PLASTIC LIMIT PLASTIC LIMIT PLASTICITY INDEX SAMPLE AIR DRIED YES NO FRACTURED FACES COARSE AGGREGATE BY WEIGHT ONE OR MORE FACES, % > ASTM D5821 FLH T507 FAA TWO OR MORE FACES, % > PROCEDURE: A STM D3744 AASHTO T210 Dc > PROCEDURE: A COARSE B FINE Df > DRIGANIC IMPURITIES ASTM C40 AASHTO T21 DRIGANIC PLATE NO. > DRIGANIC PLATE NO. > ASTM C142 AASHTO T112 COARSE AGGREGATE, % > PROCEDURE: A STM D3744 AASHTO T210 Dc > PROCEDURE: A COARSE B FINE Df > UNCOMPACTED VOID CONTENT ASTM C1252 STM > ASTM C142 AASHTO T112 COARSE AGGREGATE, % > TWO OR MORE FACES, % > PROCEDURE: A STM D3744 AASHTO T210 Dc > PROCEDURE: A STM C1252 STM > UNCOMPACTED VOID CONTENT ASTM C1252 STM > **ORGANIC PLATE NO. **ORGANIC			The second second			51N5 400050475 2/ 3					
PLASTIC LIMIT PLASTICITY INDEX SAMPLE AIR DRIED YES NO FRACTURED FACES COARSE AGGREGATE BY WEIGHT ONE OR MORE FACES, % → ASTM D5821 FLH T507 FAA TWO OR MORE FACES, % → CLEANNESS VALUE CA227 → DURABILITY INDEX ASTM D3744 AASHTO T210 D _C → PROCEDURE: A COARSE B FINE Df → DRIGANIC IMPURITIES ASTM C40 AASHTO T21 DRIGANIC PLATE NO. → UNCOMPACTED VOID CONTENT ASTM C1252 M →	Management and the same of	B RESULT	SPECIFICATION	-							
FRACTURED FACES COARSE AGGREGATE BY WEIGHT ONE OR MORE FACES, % > SAMPLE AIR DRIED YES NO ASTM D5821 FLH T507 FAA TWO OR MORE FACES, % > CLEANNESS VALUE CA227 > DURABILITY INDEX ASTM D3744 AASHTO T210 D _C > PROCEDURE: A COARSE B FINE C COARSE & FINE D _f > ORGANIC IMPURITIES ASTM C40 AASHTO T21 ORGANIC PLATE NO. > UNCOMPACTED VOID CONTENT ASTM C1252 % >				ASTM C142	☐ AASHTO T112	COARSE AGGREGATE, %					
SAMPLE AIR DRIED VES NO ASTM D5821 FLH T507 FAA TWO OR MORE FACES, % > CLEANNESS VALUE CA227 > DURABILITY INDEX ASTM D3744 AASHTO T210 D _C > PROCEDURE: A COARSE B FINE C COARSE & FINE D _f > DRIGANIC IMPURITIES ASTM C40 AASHTO T21 DRIGANIC PLATE NO. > UNCOMPACTED VOID CONTENT ASTM C1252 % >											
CLEANNESS VALUE CA227 > DURABILITY INDEX ASTM D3744 AASHTO T210 D _C > PROCEDURE: A COARSE B FINE C COARSE & FINE D _f > ORGANIC IMPURITIES ASTM C40 AASHTO T21 ORGANIC PLATE NO. > UNCOMPACTED VOID CONTENT ASTM C1252 % >						TO DE LO SUSPENDISTE ME M		1			
PROCEDURE: A COARSE B FINE C COARSE & FINE ORGANIC IMPURITIES ASTM C40 AASHTO T21 ORGANIC PLATE NO. UNCOMPACTED VOID CONTENT ASTM C1252 % →	SAMPLE AIR DRIED	☐YES ☐ NO		ASTM D582	FLH T507 FAA	TWO OR MORE FACES, % →					
ORGANIC IMPURITIES ☐ ASTM C40 ☐ AASHTO T21 ORGANIC PLATE NO. → UNCOMPACTED VOID CONTENT ☐ ASTM C1252 ☐ % →	CLEANNESS VALUE	CA227 -	•			PARTY PROPERTY OF CONTRACTOR OF THE PARTY OF					
DRGANIC PLATE NO. → UNCOMPACTED VOID CONTENT ASTM C1252 5	DRGANIC IMPURITIE	HTIES ASTM CAD AASHTO TO			PROCEDURE: A COARSE B FINE C COARSE & FINE Df						
					UNCOMPACTED VOID CONTENT ☐ ASTM C1252 ☐ % →						
CARBONATES IN AGGREGATE FLAT & ELONGATED PARTICLES ☐ ASTM D4791 ☐ BY WEIGHT, % →	CARBONATES IN AG	GREGATE		FLAT & ELONGA	ATED PARTICLES ASTM D4791	BY WEIGHT, % →					
ARIZ 238 ASTM D3042 % → DIMENSIONAL RATIO USED 1:2 1:3 1:5 BY NUMBER, % →				A Landon Elementary (Artista)							

Comments:

Copies To: CLIENT (2) - ELECTRONIC

THE SERVICES REFERRED TO HEREIN WERE PERFORMED IN ACCORDANCE WITH THE STANDARD OF CARE PRACTICED LOCALLY FOR THE REFERENCED METHOD(S) AND RELATE ONLY TO THE CONDITION(S) OR SAMPLE(S) TESTED AS STATED HEREIN. WESTERN TECHNOLOGIES INC. MAKES NO OTHER WARRANTY OR REPRESENTATION, EXPRESSED OR IMPLIED, AND HAS NOT CONFIRMED INFORMATION INCLUDING SOURCE OF MATERIALS SUBMITTED BY OTHERS.

REVIEWED BY



PHYSICAL PROPERTIES OF SOILS & AGGREGATES

Client ANDERSON ENGINEERING 977 WEST 2100 SOUTH SALT LAKE CITY, UT 84119 Date of Report 12-14-12 Job No. 3151JM098

Event / Invoice No. 31520185-26

Lab No. 0981120-1

Authorized by CHRIS SANCHEZ

Date 10-22-12

Sampled by CLIENT
Submitted by J. GISSEMAN

Date 11-07-12 Date 11-14-12

Arch. / Engr. ANDERSON ENGINEERING

Supplier / Source BORINGS

Location RICO, COLORADO

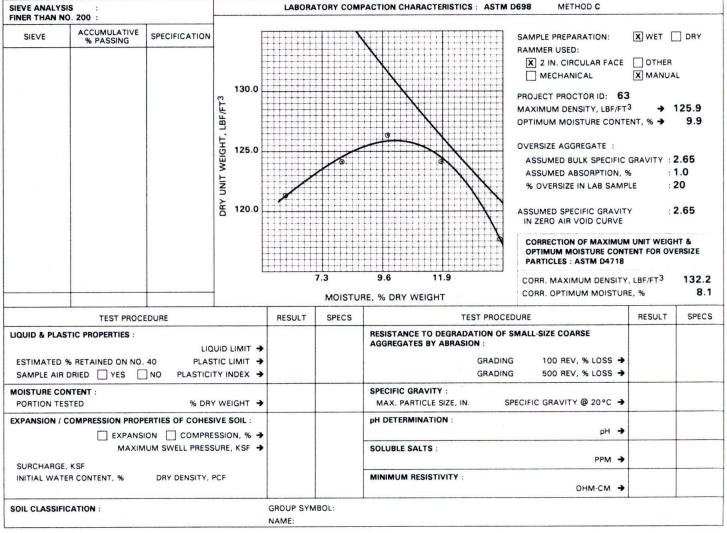
Source / Location Desig. By CLIENT

Date 11-14-12

Project RICO INITIAL SOLIDS REMOVAL AND DRYING Contractor FLARE CONSTRUCTION
Type / Use of Material VARIABLE
Sample Source / Location MW-204, 0-25.5'
Testing Authorized:

Testing Authorized : Special Instructions :

TEST RESULTS



Comments:

Copies to: CLIENT (1)

THE SERVICES REFERRED TO HEREIN WERE PERFORMED IN ACCORDANCE WITH THE STANDARD OF CARE PRACTICED LOCALLY FOR THE REFERENCED METHOD(S) AND RELATE ONLY TO THE CONDITIONIS) OR SAMPLE(S) TESTED AS STATED HEREIN. WESTERN TECHNOLOGIES INC. MAKES NO OTHER WARRANTY OR REPRESENTATION, EXPRESSED OR IMPLIED, AND HAS NOT CONFIRMED INFORMATION INCLUDING SOURCE OF MATERIALS SUBMITTED BY OTHERS.



LABORATORY REPORT

Client ANDERSON ENGINEERING COMPANY, INC.

Job No. 3151JM098

Lab No.

977 WEST 2100 SOUTH SALT LAKE CITY, UT 84119 Event / Invoice No. 31520185-15 Authorized By C. SANCHEZ

Date 10-22-12

Sampled By CLIENT

Date of Report 12-08-12

Date 10-29-12

Submitted By R. BORREGO

Date 11-07-12

Project RICO INITIAL SOLIDS REMOVAL & DRYING

Contractor FLARE CONSTRUCTION

Type / Use of Material VARIOUS

Sample Source / Location SSR-103

Location RICO, COLORADO

Arch. / Engr. ANDERSON ENGINEERING

Supplier / Source BORINGS

Source / Location Desig. By CLIENT

Date 10-29-12

Reference: ASTM Special Instructions:

TEST RESULTS

ELEVATION (FT)	MOISTURE CONTENT (%)	ATTERBERGS:	LL	PL	PI	ORGANIC CONTENT (%)
0-5' BAGGIE	11.3					
10-13' BAGGIE	12.3					
25-30' BAGGIE	7.2					
5-35' BULK	2.4		28	20	8	
60-65' BAGGIE	10.8					
37-70' BULK	6.5					
80-86' BAGGIE	11.1					
70-87' BULK	8.8					

Comments: SEE ADDITIONAL PHYSICAL PROPERTIES REPORTS FOR **GRADATIONS**

Copies To: CLIENT (2)

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PHYSICAL PROPERTIES OF AGGREGATES

Client ANDERSON ENGINEERING 977 WEST 2100 SOUTH SALT LAKE CITY, UT 84119 Date of Report 12-10-12

Job No. 3151JM098

Event / Invoice No. 315200185-15

Lab No. 0981109-

Authorized By C. SANCHEZ

Date 10-22-12 Date 10-29-12

Sampled By CLIENT
Submitted By R. BORREGO

Date 11-07-12

Project RICO INITIAL SOLIDS

Contractor FLARE CONSTRUCTION

Type / Use of Aggregate VARIABLE

Sample Source / Location SSR-103 BULK 5-35'

Arch. / Engr. ANDERSON ENGINEERING

Supplier / Source BORINGS

Location RICO, COLORADO

Source / Location Desig. By CLIENT

Date 10-29-12

Special Instructions: 0981109-4

TEST RESULTS

	W	AARUTO TOT		PHYSICAL PROPER	TIEC	TEST	SPECIFICATION
SIEVE ANALYSIS SIEVE SIZE	ACCUMULATIVE	AASHTO T27		PHYSICAL PROPER	ITES	RESULTS	SPECIFICATION
U.S MM	ACCUMULATIVE % PASSING	SPECIFICATION					
4 IN100.0			UNIT WEIGHT &	VOIDS FINE AGGE	REGATE UNIT WEIGHT, PCF -		
3 - 75.0			ASTM C29	AASHTO T19	VOIDS, % →		
2 - 50.0			RODDING	JIGGING LOOSE COARSE A	GGREGATE UNIT WEIGHT, PCF >		
1 1/2 - 37.5					VOIDS, % →		
1 1/4 - 31.5				,			
1 - 25.0	100			FINE AGGREGATE	BULK SPECIFIC GRAVITY -		
3/4 - 19.0	84		10	ASTM C128 AASHTO T84	BULK SPECIFIC GRAVITY (SSD) -		
1/2 - 12.5	71		SPECIFIC	AGGREGATE DRIED	APPARENT SPECIFIC GRAVITY ->		
3/8 - 9.5	67			YES NO	ABSORPTION, % →		
1/4 - 6.3	61		GRAVITY &				+
NO. 4 - 4.75	57		ABSORPTION	COARSE AGGREGATE	BULK SPECIFIC GRAVITY -		
8 - 2.36	50			ASTM C127 AASHTO T85	BULK SPECIFIC GRAVITY (SSD) >		
10 - 2.00	48			AGGREGATE DRIED	APPARENT SPECIFIC GRAVITY -		
16 - 1.18	44			YES NO	ABSORPTION, % →		
30 - 600	39						+
40 - 425	37		SAND EQUIVAL	ENT VALUE ASTM D2419	AASHTO T176 % →		
50 - 300	34						
100150	26			SMALL COARSE AGGREGATE	100 REV., % LOSS →		
FINER THAN NO. 2		-	RESISTANCE	☐ ASTM C131 ☐ AASHTO T96			
X ASTM C117	19.9		то				
AASHTO T11	10.0		DEGRADATION	LARGE COARSE AGGREGATE			
LI AASITIO III		L		ASTM C535 GRADING	1000 REV., % LOSS →		
FINENESS MODUL	.us, ASTM C125 +	•					
THEREOF MODE			LIGHTWEIGHT I	PIECES			
LIQUID & PLASTI	PROPERTIES		ASTM C123	AASHTO T113	COARSE AGGREGATE, % >		
ASTM D4318	AASHTO T89	& T90					+
METHOD A		SPECIFICATION	CLAY LUMPS &	FRIABLE PARTICLES	FINE AGGREGATE, % ->		
LIQUID LIMIT	d. 50		ASTM C142	AASHTO T112	COARSE AGGREGATE, % >		
PLASTIC LIMIT							
PLASTICITY INDE	x		FRACTURED FA	CES COARSE AGGREGATE BY WE	IGHT ONE OR MORE FACES, % →		
SAMPLE AIR DRIE			ASTM D582	1 FLH T507 FAA	TWO OR MORE FACES, % →		
Option 22 Transition							
CLEANNESS VALU	JE CA227 -	•		DEX ASTM D3744 AASHTO			
			PROCEDURE:	A COARSE B FINE C C	OARSE & FINE D →		
ORGANIC IMPURI	TIES ASTM C40	AASHTO T2					
ORGANIC PLATE	TO STATE OF THE ST	→		VOID CONTENT ASTM C1252	₩ →		
				2-32			
CARBONATES IN	AGGREGATE		FLAT & ELONG	ATED PARTICLES ASTM D4791	Manual Ma		
☐ ARIZ 238 ☐ A	ASTM D3042 % -	>	DIMENSIONAL	RATIO USED 1:2 1:3 1:5	5 ☐ BY NUMBER, % →		
							1

Comments:

Copies To: CLIENT (2) - ELECTRONIC

THE SERVICES REFERRED TO HEREIN WERE PERFORMED IN ACCORDANCE WITH THE STANDARD OF CARE PRACTICED LOCALLY FOR THE REFERENCED METHOD(S) AND RELATE ONLY TO THE CONDITION(S) OR SAMPLE(S) TESTED AS STATED HEREIN. WESTERN TECHNOLOGIES INC. MAKES NO OTHER WARRANTY OR REPRESENTATION, EXPRESSED OR IMPLIED, AND HAS NOT CONFIRMED INFORMATION INCLUDING SOURCE OF MATERIALS, SUBMITTED BY OTHERS.

REVIEWED BY



PHYSICAL PROPERTIES **OF AGGREGATES**

Client ANDERSON ENGINEERING 977 WEST 2100 SOUTH SALT LAKE CITY, UT 84119 Date of Report 12-10-12 Job No. 3151JM098

Event / Invoice No. 315200185-15

Lab No. 0981109-Date 10-22-12

Authorized By C. SANCHEZ

Sampled By CLIENT Submitted By R. BORREGO Date 10-29-12 Date 11-07-12

Project RICO INITIAL SOLIDS Contractor FLARE CONSTRUCTION

Type / Use of Aggregate VARIABLE

Sample Source / Location SSR-103 BULK 37-70'

Special Instructions: 0981109-6

Location RICO, COLORADO

Arch. / Engr. ANDERSON ENGINEERING

Supplier / Source BORINGS

Source / Location Desig. By CLIENT

Date 10-29-12

TEST RESULTS

				IEST NESULIS			
SIEVE ANALYSIS		AASHTO T27		PHYSICAL PROPER	TIES	TEST RESULTS	SPECIFICATION
SIEVE SIZE U.S. – MM	ACCUMULATIVE % PASSING	SPECIFICATION					
4 IN100.0			UNIT WEIGHT &	VOIDS FINE AGGR	EGATE UNIT WEIGHT, PCF →		
3 - 75.0			ASTM C29		VOIDS, % →		
2 - 50.0				JIGGING LOOSE COARSE AG	GGREGATE UNIT WEIGHT, PCF >		
1 1/2 - 37.5					VOIDS, % →		
1 1/4 - 31.5			T				
1 - 25.0	100			FINE AGGREGATE	BULK SPECIFIC GRAVITY →		
3/4 - 19.0	92			ASTM C128 AASHTO T84	BULK SPECIFIC GRAVITY (SSD) >		
1/2 - 12.5	88			AGGREGATE DRIED	APPARENT SPECIFIC GRAVITY ->		
3/8 - 9.5	83		SPECIFIC	YES NO	ABSORPTION, % →		
1/4 - 6.3	75		GRAVITY &				+
NO. 4 - 4.75	71		ABSORPTION	COARSE AGGREGATE	BULK SPECIFIC GRAVITY -		
8 - 2.36	61			ASTM C127 AASHTO T85	BULK SPECIFIC GRAVITY (SSD) >		
10 - 2.00	60			AGGREGATE DRIED	APPARENT SPECIFIC GRAVITY		
16 - 1.18	54			YES NO	ABSORPTION, % →		
30600	49						
40425	45		SAND EQUIVALE	ENT VALUE ASTM D2419 A	AASHTO T176 % →		
50300	43						
100150	36			SMALL COARSE AGGREGATE	100 REV., % LOSS → GRADING 500 REV., % LOSS →		
FINER THAN NO. 200	- 1		RESISTANCE	ASTM C131 AASHTO T96			
X ASTM C117	29.0		RESISTANCE TO DEGRADATION				
AASHTO T11				LARGE COARSE AGGREGATE	200 REV., % LOSS → 1000 REV., % LOSS →		
				ASTM C535 GRADING	1000 REV., % 1033 7		
FINENESS MODULU	S, ASTM C125 7	•	LIGHTWEIGHT F	NECES	FINE AGGREGATE, % ->		
LIQUID & PLASTIC	PROPERTIES			AASHTO T113	COARSE AGGREGATE, %		
	AASHTO T89 8	2. TOO	ASTIN CT25	- Andriio Filo			
METHOD A	- CONTRACTOR CONTRACTO	SPECIFICATION	CLAY LUMPS &	FRIABLE PARTICLES	FINE AGGREGATE, % ->		
LIQUID LIMIT	B NESOLI	Si Ecil ICATION	-	AASHTO T112	COARSE AGGREGATE, % ->		
PLASTIC LIMIT							+
PLASTICITY INDEX			FRACTURED FAC	CES COARSE AGGREGATE BY WEI	GHT ONE OR MORE FACES, % →		
SAMPLE AIR DRIED	errore error		ASTM D5821	FLH T507 FAA	TWO OR MORE FACES, % ->		
			-				
CLEANNESS VALUE	CA227 -			DEX ASTM D3744 AASHTO			
			PROCEDURE:	A COARSE B FINE C CC	DARSE & FINE Df →		
ORGANIC IMPURITI	ES ASTM C40	AASHTO T21					
ORGANIC PLATE NO	o. 🔒	•	UNCOMPACTED	VOID CONTENT ASTM C1252	∞ →		
				ATED PARTICLES ASTM D4791	DV WEIGHT N		
CARBONATES IN A			Descriptions and the property of the				
ARIZ 238 AS	STM D3042 % -		DIMENSIONAL F	TATIO USED 1:2 1:3 1:5	BT NOMBER, % 7		

Comments:

Copies To: CLIENT (2) - ELECTRONIC

THE SERVICES REFERRED TO HEREIN WERE PERFORMED IN ACCORDANCE WITH THE STANDARD OF CARE PRACTICED LOCALLY FOR THE REFERENCED METHOD(S) AND RELATE ONLY TO THE CONDITION(S) OR SAMPLE(S) TESTED AS STATED HEREIN. WESTERN TECHNOLOGIES INC. MAKES NO OTHER WARRANTY OR REPRESENTATION, EXPRESSED OR IMPLIED, AND HAS NOT CONFIRMED INFORMATION INCLUDING SOURCE OF MATERIALS SUBMITTED BY OTHERS.



PHYSICAL PROPERTIES OF AGGREGATES

Client ANDERSON ENGINEERING 977 WEST 2100 SOUTH SALT LAKE CITY, UT 84119 Date of Report 12-10-12 Job No. 3151JM098

Event / Invoice No. 315200185-15

Lab No. 0981109-

Authorized By C. SANCHEZ

Date 10-22-12 Date 10-29-12

Sampled By CLIENT
Submitted By R. BORREGO

Date 11-07-12

Project RICO INITIAL SOLIDS

Contractor FLARE CONSTRUCTION

Type / Use of Aggregate VARIABLE

Sample Source / Location SSR-103 BULK 70-87'

Location RICO, COLORADO

Arch. / Engr. ANDERSON ENGINEERING

Arch. / Engl. Arebendor Endirecen

Supplier / Source BORINGS

Source / Location Desig. By CLIENT

Date 10-29-12

Special Instructions: 0981109-8

TEST RESULTS

SIEVE ANALYSIS	ASTM C136	AASHTO T27		PHYSICAL PROPER	TIFS	TEST	SPECIFICATION
SIEVE ANALTSIS Z	ACCUMULATIVE	SPECIFICATION		FRI GICAL PROPER		RESULTS	S. Edil Idalion
U.S MM	% PASSING	G-ECH ICATION		0.0000000000000000000000000000000000000			
4 IN100.0			UNIT WEIGHT &	The state of the s	OFFICE OFFICE OF STREET, STREE		
3 - 75.0				AASHTO T19	VOIDS, % →		
2 - 50.0			RODDING	JIGGING LOOSE COARSE A			
$1 \frac{1}{2} - 37.5$					VOIDS, % →		
$1 \frac{1}{4} - 31.5$							
1 - 25.0				FINE AGGREGATE	BULK SPECIFIC GRAVITY -		
3/4 - 19.0	100			ASTM C128 AASHTO T84	BULK SPECIFIC GRAVITY (SSD)		
1/2 - 12.5	97			AGGREGATE DRIED	APPARENT SPECIFIC GRAVITY		
3/8 - 9.5	94		SPECIFIC GRAVITY	YES NO	ABSORPTION, % >		
1/4 - 6.3	88		&				
NO. $4 - 4.75$	83		ABSORPTION	COARSE AGGREGATE	BULK SPECIFIC GRAVITY >		
8 - 2.36	73			ASTM C127 AASHTO T85	BULK SPECIFIC GRAVITY (SSD)		
10 - 2.00	71			AGGREGATE DRIED	APPARENT SPECIFIC GRAVITY		
16 - 1.18	64			YES NO	ABSORPTION, % →		
30600	57						
40425	54		SAND EQUIVAL	ENT VALUE ASTM D2419	AASHTO T176 % →		
50300	50				100 REV., % LOSS →		
100150	42		RESISTANCE TO DEGRADATION	SMALL COARSE AGGREGATE			
FINER THAN NO. 200				ASTM C131 AASHTO T96			
X ASTM C117	35.1			V 8 200 27 27 27 27 27 27 27 27 27 27 27 27 27			
AASHTO T11				LARGE COARSE AGGREGATE	200 REV., % LOSS →		
			1	ASTM C535 GRADING	1000 REV., % LOSS →		
FINENESS MODULU	S, ASTM C125	→		urore.	FINE AGGREGATE, % ->		
			LIGHTWEIGHT				
LIQUID & PLASTIC			ASTM C123	AASHTO T113	COARSE AGGREGATE, % →		
	AASHTO T89	The second secon	CLAVILIADA O	FRIABLE PARTICLES	FINE AGGREGATE, % ->		
METHOD A	B RESULT	SPECIFICATION		CONTRACTOR OF SECURIOR SECURIO	COARSE AGGREGATE, % →		
LIQUID LIMIT			☐ASTM C142		+		
PLASTIC LIMIT			FRACTURED FA	CES COARSE AGGREGATE BY WE	IGHT ONE OR MORE FACES, % →		
PLASTICITY INDEX				1 FLH T507 FAA	TWO OR MORE FACES, % →		
SAMPLE AIR DRIED	LYES L NO		MSTN D502				+
	CA227 -		DURARII ITV IN	DEX ASTM D3744 AASHTO	T210 D _c →		
CLEANNESS VALUE	CA22/ 5			A COARSE B FINE C C			
ORGANIC IMPURITI	ER ASTM CAG	AASHTO TO	the second second second				+
ORGANIC IMPURITI		→		VOID CONTENT ASTM C1252	□ % →		
UNGANIC PLATE NO	J	-					+
CARBONATES IN A	GGREGATE		FLAT & ELONG	ATED PARTICLES ASTM D4791	BY WEIGHT, % →		
ARIZ 238 AS		•	DIMENSIONAL				
Am2 200 As	, DOO-12 /0			100 miles			1

Comments:

Copies To: CLIENT (2) - ELECTRONIC

THE SERVICES REFERRED TO HEREIN WERE PERFORMED IN ACCORDANCE WITH THE STANDARD OF CARE PRACTICED LOCALLY FOR THE REFERENCED METHOD(S) AND RELATE ONLY TO THE CONDITION(S) OR SAMPLE(S) TESTED AS STATED HEREIN. WESTERN TECHNOLOGIES INC. MAKES NO OTHER WARRANTY OR REPRESENTATION, EXPRESSED OR IMPLIED, AND HAS NOT CONFIRMED INFORMATION INCLUDING SOURCE OF MATERIALS SUBMITTED BY OTHERS.

REVIEWED BY

Soils Testing

2. Samples from Test Pits

TP-2004A

TP-2004B

TP2011-AT1

TP2011-AT2

TP2011-AT3

TP2011-AT4

TP2011-AT5

TP2011-AT6

TP2011-17

TP-17

TP-18

TP-22

TP-2013XX

TP-2013YY

TP-2013Z



278 Sawyer Drive, No. 2 Durango, Colorado 81302

(970) 375-9033 • fax: 375-9034

PHYSICAL PROPERTIES OF SOILS & AGGREGATES

Client ANDERSON ENGINEERING 977 WEST 2100 SOUTH **SALT LAKE CITY, UT 84119** Date of Report 12-09-11 Job No. 3151JM098

Event / Invoice No. 31510186-106

Lab No. 0981104-1

Authorized by CHRIS SANCHEZ

Date 10-21-11

Sampled by CLIENT

Date 10-21-11

Submitted by D. SENJEM

Date 10-31-11

Project RICO INITIAL SOLIDS REMOVAL AND DRYING

Contractor FLARE CONSTRUCTION

Type / Use of Material 4" MINUS SILTY CLAYEY SAND W/GRAV.

Sample Source / Location TP-1 (TP2011-AT1)

Testing Authorized:

Special Instructions:

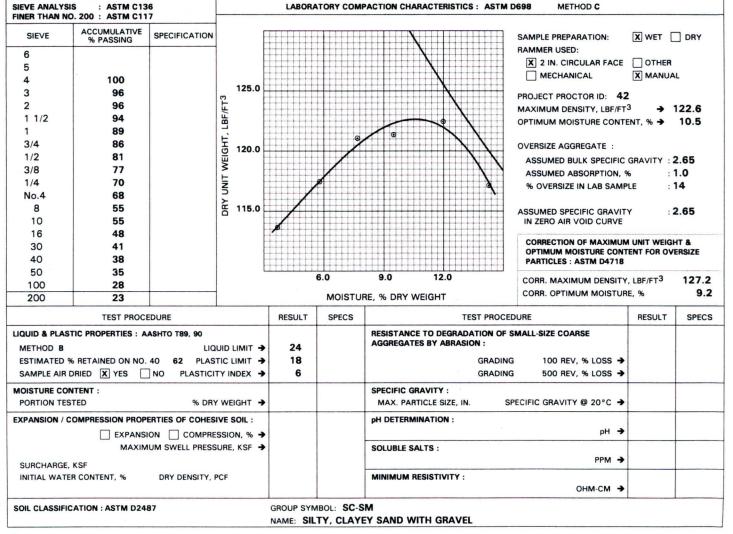
Location RICO, COLORADO

Arch. / Engr. ANDERSON ENGINEERING

Supplier / Source EXISTING SUBGRADE Source / Location Desig. By CLIENT

Date 10-21-11

TEST RESULTS



Comments:

Copies to: CLIENT (1)

THE SERVICES REFERRED TO HEREIN WERE PERFORMED IN ACCORDANCE WITH THE STANDARD OF CARE PRACTICED LOCALLY FOR THE REFERENCED METHOD(S) AND RELATE ONLY TO THE CONDITION(S) OR SAMPLE(S) TESTED AS STATED HEREIN. WESTERN TECHNOLOGIES INC. MAKES NO OTHER WARRANTY OR REPRESENTATION, EXPRESSED OR IMPLIED, AND HAS NOT CONFIRMED INFORMATION INCLUDING SOURCE OF MATERIALS SUBMITTED BY OTHERS.





PHYSICAL PROPERTIES OF SOILS & AGGREGATES

Client ANDERSON ENGINEERING 977 WEST 2100 SOUTH SALT LAKE CITY, UT 84119 Date of Report 12-07-11 Job No. 3151JM098

Event / Invoice No. 31510186-95

Lab No. 0981129-2

Authorized by CHRIS SANCHEZ

Date 10-21-11

Sampled by CLIENT

Date 10-21-11

Submitted by D. SENJEM

Date 10-31-11

Project RICO INITIAL SOLIDS REMOVAL AND DRYING

Contractor FLARE CONSTRUCTION

Type / Use of Material 3" MINUS SILTY GRAVEL WITH SAND

Sample Source / Location TP-2 (TP2011-AT2)

Testing Authorized:

Special Instructions:

Location RICO, COLORADO
Arch. / Engr. ANDERSON ENGINEERING
Supplier / Source EXISTING SUBGRADE

Source / Location Desig. By CLIENT

Date 10-21-11

TEST RESULTS

SIEVE ANALYSIS		_		LABORA	TORY COMP	ACTION CHARACTERISTICS : ASTM D	0698 METHOD C		
FINER THAN NO.	200 : ASTM C11	7							
SIEVE	ACCUMULATIVE % PASSING	SPECIFICATION					SAMPLE PREPARATION:	X WET	DRY
6						+++++++++++++++++++++++++++++++++++++++	RAMMER USED:		
5							X 2 IN. CIRCULAR FACE	OTHER	
4							☐ MECHANICAL	X MANUAL	-
3	100		135.0				PROJECT PROCTOR ID: 38		
2	90		13						29.7
1 1/2	84		7,				MAXIMUM DENSITY, LBF/FT		10.2
1 1/2	77		9				OPTIMUM MOISTURE CONTE	:N1, % →	10.2
3/4	72		172.0 UNIT WEIGHT, LBF/FT				OVERSIZE AGGREGATE :		
1/2	66		ភ្នំ 130.0				ASSUMED BULK SPECIFIC	GRAVITY . 2	65
3/8	64		3				ASSUMED ABSORPTION, %	_	.0
1/4	58		=				% OVERSIZE IN LAB SAMP		
No.4	54		5				70 OVERSIZE IN LAB SAIVII		
8	45		€ 125.0	<i>d</i>			ASSUMED SPECIFIC GRAVITY	v	2.71
10	42						IN ZERO AIR VOID CURVE		
16	37								
30	31					<u> </u>	OPTIMUM MOISTURE CONT		
40	28						PARTICLES : ASTM D4718	LINI FOR OVE	MOILL
50	25			1	0.0	12.0 14.0		100.003	138.0
100	21				0.0	12.0	CORR. MAXIMUM DENSITY		
200	17				MOISTUF	RE, % DRY WEIGHT	CORR. OPTIMUM MOISTUR	E, %	7.6
	TEST PROCE	EDURE		RESULT	SPECS	TEST PROCEI	DURE	RESULT	SPECS
LIQUID & PLAST	IC PROPERTIES : A	STM D4318				RESISTANCE TO DEGRADATION OF S	MALL-SIZE COARSE		
METHOD B		LIQ	UID LIMIT ->	21		AGGREGATES BY ABRASION :			
ESTIMATED %	RETAINED ON NO.	40 72 PLAS	TIC LIMIT -	0		GRADING	100 REV, % LOSS →		
SAMPLE AIR D	RIED X YES	NO PLASTICI	TY INDEX →	NP		GRADING	500 REV, % LOSS →		
MOISTURE CON	TENT :					SPECIFIC GRAVITY :			
PORTION TEST	TED	% DR	Y WEIGHT →			MAX. PARTICLE SIZE, IN. SI	PECIFIC GRAVITY @ 20°C →		
EXPANSION / CO	OMPRESSION PROP	ERTIES OF COHES	IVE SOIL :			pH DETERMINATION:			
	EXPANSI	ON COMPRE	SSION, % >			*	pH →		
CUROUAROS.		IUM SWELL PRESS	SURE, KSF ->			SOLUBLE SALTS:	PPM →		
SURCHARGE, INITIAL WATER		DRY DENSITY,	PCE			MINIMUM RESISTIVITY:			
INTIAL WATER	DRT DENGITT,					онм-см →			
SOIL CLASSIFIC	ATION : ASTM D24	87		GROUP SYM	BOL: GM				
	±			NAME: SIL	TY GRAVE	L WITH SAND			

Comments :

Copies to: CLIENT (1)

THE SERVICES REFERRED TO HEREIN WERE PERFORMED IN ACCORDANCE WITH THE STANDARD OF CARE PRACTICED LOCALLY FOR THE REFERENCED METHOD(S) AND RELATE ONLY TO THE CONDITION(S) OR SAMMLEIS) TESTED AS STATED HEREIN. WESTERN TECHNOLOGIES INC. MAKES NO OTHER WARRANTY OR REPRESENTATION, EXPRESSED OR IMPLIED, AND HAS NOT CONFIRMED INFORMATION INCLUDING SOURCE OF MATERIALS SUBMITTED BY OTHERS.



PHYSICAL PROPERTIES OF SOILS & AGGREGATES

Client ANDERSON ENGINEERING 977 WEST 2100 SOUTH SALT LAKE CITY, UT 84119 Date of Report 12-07-11 Job No. 3151JM098

Event / Invoice No. 31510186-96

Authorized by CHRIS SANCHEZ Date 10-21-11

Sampled by **CLIENT** Submitted by D. SENJEM Date 10-21-11 Date 10-31-11

Lab No. 0981104-3

Location RICO, COLORADO

Arch. / Engr. ANDERSON ENGINEERING Supplier / Source EXISTING SUBGRADE

Source / Location Desig. By CLIENT

Date 10-21-11

Contractor FLARE CONSTRUCTION

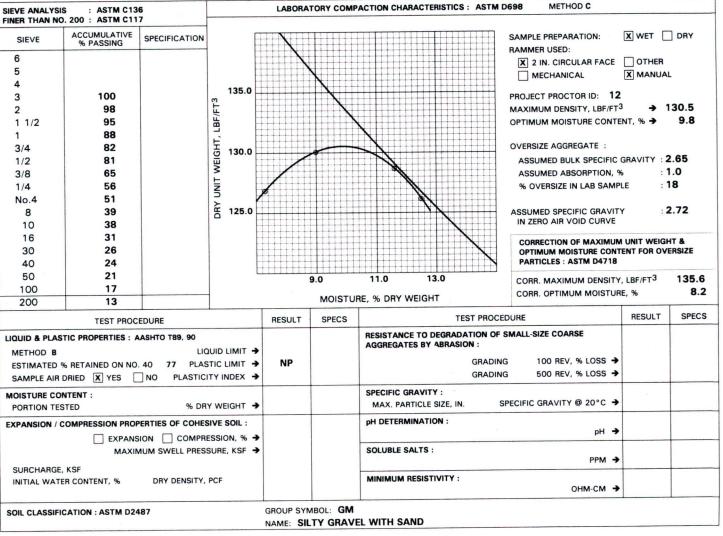
Type / Use of Material 3' MINUS SILTY GRAVEL WITH SAND

Project RICO INITIAL SOLIDS REMOVAL AND DRYING

Sample Source / Location TP-3 (TP2011-AT3)

Testing Authorized: Special Instructions:

TEST RESULTS



Comments:

Copies to: CLIENT (1)

THE SERVICES REFERRED TO HEREIN WERE PERFORMED IN ACCORDANCE WITH THE STANDARD OF CARE PRACTICED LOCALLY FOR THE REFERENCED METHODIS) AND RELATE ONLY TO THE CONDITIONIS) OR SAMPLE(S) TESTED AS STATED HEREIN. WESTERN TECHNOLOGIES INC. MAKES NO OTHER WARRANTY OR REPRESENTATION, EXPRESSED OR IMPLIED, AND HAS NOT CONFIRMED INFORMATION INCLUDING SOURCE OF MATERIALS SUBMITTED BY OTHERS.





PHYSICAL PROPERTIES OF SOILS & AGGREGATES

Client ANDERSON ENGINEERING 977 WEST 2100 SOUTH SALT LAKE CITY, UT 84119 Date of Report 12-07-11 Job No. 3151JM098

Event / Invoice No. 31510186-97

Lab No. 0981104-4

Authorized by CHRIS SANCHEZ Sampled by **CLIENT**

Date 10-21-11

Submitted by D. SENJEM

Date 10-21-11

Date 10-31-11

Project RICO INITIAL SOLIDS REMOVAL AND DRYING

Contractor FLARE CONSTRUCTION

Type / Use of Material 4' MINUS SILTY GRAVEL WITH SAND

Sample Source / Location TP-5 (TP2011-AT5)

Testing Authorized:

Special Instructions:

Location RICO, COLORADO Arch. / Engr. ANDERSON ENGINEERING Supplier / Source EXISTING GROUND Source / Location Desig. By CLIENT

Date 10-21-11

TEST RESULTS

SIEVE ANALYSIS				LABORA	TORY COMP	ACTION CHARACTERISTICS : AS	TM D698 METHOD C		
6 5 4 3 2 1 1/2 1 3/4 1/2 3/8 1/4 No.4 8 10 16 30 40 50	. 200 : ASTM C11 ACCUMULATIVE % PASSING 100 89 86 81 72 67 62 58 53 50 44 43 39 35 32 30	7 SPECIFICATION	125.0 NNT WEIGHT, LBF/FT ³		11.0	13.0 15.0	SAMPLE PREPARATION: RAMMER USED: 2 IN. CIRCULAR FACE MECHANICAL PROJECT PROCTOR ID: 16 MAXIMUM DENSITY, LBF/FT- OPTIMUM MOISTURE CONTE OVERSIZE AGGREGATE : ASSUMED ABSORPTION, 9 % OVERSIZE IN LAB SAMP ASSUMED SPECIFIC GRAVIT IN ZERO AIR VOID CURVE CORRECTION OF MAXIMUM OPTIMUM MOISTURE CONTE PARTICLES: ASTM D4718 CORR. MAXIMUM DENSITY	MANUAL 3 → 1 ENT, % → GRAVITY : 2 6 : 1 PLE : 3 Y : 2 M UNIT WEIGHTENT FOR OVI	121.8 12.1 2.65 1.0 33
100	25	-			MOISTUE	E, % DRY WEIGHT	CORR. OPTIMUM MOISTUR		8.4
200	19				MOISTOR				
	TEST PROC	EDURE		RESULT	SPECS		ROCEDURE	RESULT	SPECS
METHOD B ESTIMATED % SAMPLE AIR D MOISTURE CON		LIO . 40 68 PLAS NO PLASTICI	TIC LIMIT → TY INDEX →	35 27 8			ADING 100 REV, % LOSS → ADING 500 REV, % LOSS → SPECIFIC GRAVITY @ 20°C →		
PORTION TEST						CAME HISTORY ENGINEERING DECIMAL CONT.			
EXPANSION / C	OMPRESSION PROF					pH DETERMINATION :	pH →		
	MAXIM	SION COMPRE				SOLUBLE SALTS :	PPM →		
SURCHARGE,	DRY DENSITY,	PCF			MINIMUM RESISTIVITY:	OHM-CM →			
SOIL CLASSIFIC	ATION : ASTM D24	187		GROUP SYN NAME: SIL		L WITH SAND			

Comments:

Copies to: CLIENT (1)

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PHYSICAL PROPERTIES OF SOILS & AGGREGATES

Client ANDERSON ENGINEERING 977 WEST 2100 SOUTH SALT LAKE CITY, UT 84119

Contractor FLARE CONSTRUCTION

Type / Use of Material 3" MINUS CLAYEY GRAVEL WITH SAND

Date of Report 12-09-11 Job No. 3151JM098

Event / Invoice No. 31510186-107
Authorized by CHRIS SANCHEZ

Lab No. 0981104-5 Date 10-21-11

Sampled by **CLIENT**Submitted by **D. SENJEM**

Date 10-21-11
Date 10-31-11

Project RICO INITIAL SOLIDS REMOVAL AND DRYING Location RICO, COLORADO

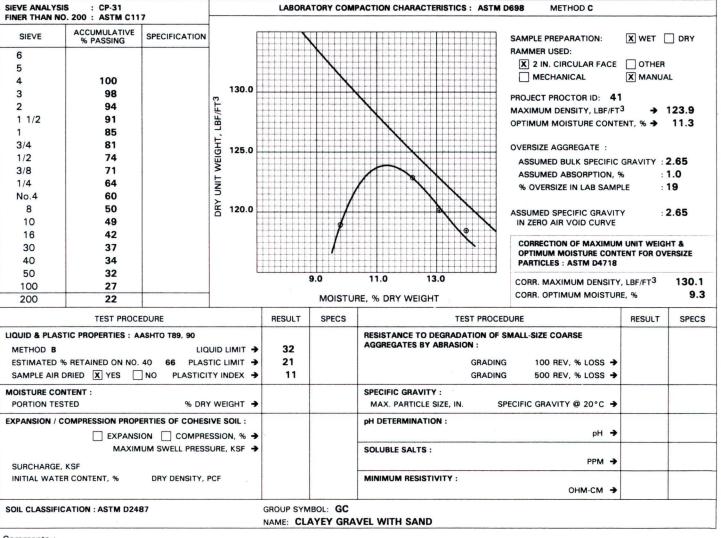
Arch. / Engr. ANDERSON ENGINEERING Supplier / Source EXISTING SUBGRADE

Source / Location Desig. By CLIENT

Date 10-21-11

Sample Source / Location TP-6 (TP2011-AT6)
Testing Authorized :
Special Instructions :

TEST RESULTS



Comments:

Copies to: CLIENT (1)

THE SERVICES REFERRED TO HEREIN WERE PERFORMED IN ACCORDANCE WITH THE STANDARD OF CARE PRACTICED LOCALLY FOR THE REFERENCED METHOD(S) AND RELATE ONLY TO THE CONDITION(S) OR SAMPLE(S) TESTED AS STATED HEREIN. WESTERN TECHNOLOGIES INC. MAKES NO OTHER WARRANTY OR REPRESENTATION, EXPRESSED OR IMPLIED, AND HAS NOT CONFIRMED INFORMATION INCLUDING SOURCE OF MATERIALS SUBMITTED BY OTHERS.

